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THE GREAT EXHIBITION.

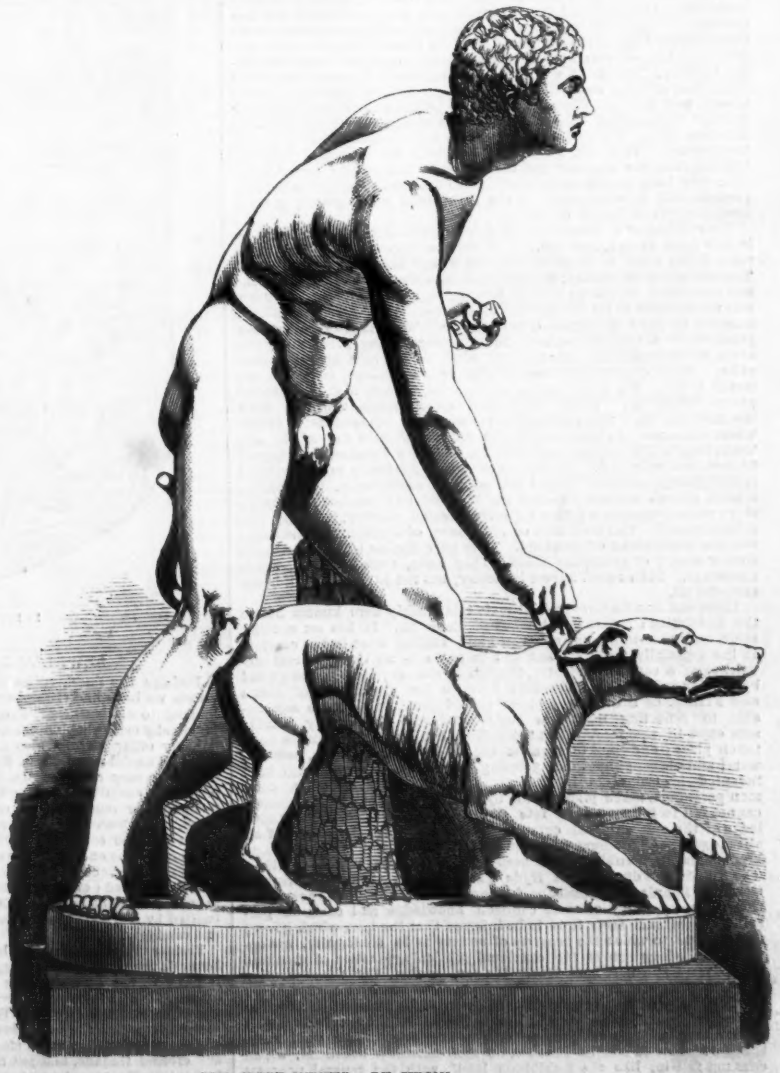
THE LITERATURE OF THE EXHIBITION.

THE Exhibition is a most interesting show. A pleasanter lounging-place for the rich never was created. To a more gratifying scene the hardworking poor were never invited. To both it has given a common pleasure, and inspired with a common interest. They admire and talk about the same objects, most of which are equally new to both. The well instructed have the advantage of understanding the objects they behold; the ignorant are vividly struck with the splendid novelties, and find some compensation for the want of knowledge in their more lively impressions. The present effects of the World's Fair in exciting an interest in the products of industry, familiarising classes and nations with things before strange or unknown, bringing together exhibitors and visitors from every part of our own empire and from most parts of the world, giving information to all, and establishing friendship and harmony between strangers of every clime and every creed, are much too well known, and have been too often dwelt on, to require any further elucidation. They are only adverted to, undoubted as they are, because they lead from the present to the future, and incite us to inquire into the probable effects of the Exhibition hereafter. It is only the savage who is perfectly satisfied with the present; civilised man, by prudence and foresight, takes a guarantee for the future. He knows that the wine, which sparkles in the cup, afterwards "bites like a serpent and stings like an adder," and he is very properly not contented unless he have a reasonable assurance, that present enjoyment will not be future trouble and misery. However difficult it may be to explain the reasons why, in many cases, and not in all, present bliss should be future sorrow, the fact is so; and it opens a large field to the fancy of those who are disposed to take the adverse side of any question; and they can always rake together numerous plausible and alarming suspicions, that, the more soft and flowery our present paths, the more certainly do they lead to destruction. To meet such cavillers, and show that the probable future effects of the Exhibition will be beneficial like its present effects, rather than to describe any part of its contents, is the object we have now in view.

We mean to speak of the literature of the Exhibition: not, however, of the various specimens of French and German typography with which it is enriched; not of the 170 versions of the Holy Scriptures, displayed by the British and Foreign Bible Society; not of the almost matchless specimens of the art of printing—using the word in its most enlarged sense—to be found in the Austrian department; not of the types of almost all the written languages of the globe, exhibited—however little noticed, all these are extremely valuable and important: but we propose to pass them by, and speak only, of the literature that has already grown from the Exhibition and is an inseparable part of it. We select that, because it will be more by the influence which the Exhibition now exercises over it, and more by the subsequent influence of literature over the public, than by any other means, that the permanent characteristics of the Exhibition will be established. It will live in print, and by print hereafter will its effects be known. Probably all great events become permanently influential by similar means. Without pretending to compare the Exhibition with the discovery of America, or our great Rebellion—though it marks a very important epoch in the history of mankind—as those stirring events were the parents of the gigantic minds of Bacon, Shakspeare, Milton, and Newton, so will the Exhibition, deeply agitating nations with the spirit of kindness, be the parent of some large mental developments. Impressing first its own peculiar features, whatever they may be, on the literary men of the age, by them they will be transmitted, enlarged, purified, and beautified to future generations, and will help to form the character of our children and our children's children.

One peculiar feature of the Exhibition, peeping out from the spangled and gilded ornaments, announcing itself massively, broadly, and unmistakably in the machinery, and winning us by its gracefulness in the sculpture, is well-defined form, leading to precision of eye, precision of language, and precision of character. Every one has, of

THE ANCIENT BRITON.—BY ADAMS.



THE GREEK HUNTER.—BY GIBSON.

This page is embellished with two works of British sculpture, the Greek Hunter," by Gibson, in marble, in the Sculpture-room; and Adams' "Ancient Briton" looking out as a scout, in plaster, in the Transept. The former is an admirable production, and the latter evinces considerable spirit and is creditable to the artist. We have, however, already sufficiently spoken of both these works in our notices upon sculpture.

course, noticed the long technological descriptions in the newspapers of the multifarious articles in the Exhibition, and of the arts connected with them. These technological descriptions are new features: every now and then, as a new invention starts into life, or an inventor calls on the public to test or to admire some great improvement, the newspapers have taken notice of it, or, if it have been important, have given as accurate a description of it as the talents at their command would supply. But the Exhibition has induced them to enlist in their services eminent technologists of all kinds, and has induced many writers to make it their express business to study industrial processes, to compare and comprehend the distinctive characteristics of their various products, in order to describe them. Its immense and varied contents, comprising more of the results of industry than were ever before collected or noticed in our books, have accordingly been, or are in process of being, minutely described with more or less skill, but in general with great accuracy, in the majority of the journals of the empire. To literary men such pursuits must impart habits of precision, a spirit of close and minute observation, and much valuable knowledge. It is for them, in fact, a new education; and, banishing the poetry of fiction and dreams, will inspire them with the poetry of reality. It will have a corresponding effect on the literary character. Habits now formed by its influence will not be readily laid aside, and they will influence the future lives of individuals and of nations. The very multitude of the objects exhibited drives man to classification as the refuge from confusion; and precision, therefore, first impressed on literature, and afterwards by literature impressed on society, seems one of the prevailing, and likely to be one of the enduring, moral effects of the Exhibition.

Nor is this fact the less remarkable, nor will it be less influential, from being only an extension, though a sudden and rapid one, of a progress before obvious. For many years it has been observed, particularly in the manufacturing districts and in the mind connected with them, that the tendency of literature has been towards realities. It has been marked by careful observation and accurate description of the production of industry and the condition of society. The rapid development of that tendency by the Exhibition falls in with the previous and general improvement, and is a permanent part of it. It is not an imported exotic—a mere excrescence, to be out grown and cast aside; a temporary phasis of the mind, like a wide-spread love for sentimental novels; or an ebullition of philanthropy in favour of ragged schools; or a fashionable attachment to dresses that sweep the streets; or even like the running to the World's Fair itself: it is a healthy growth, and part of the general intellect—a permanent step forward, the necessary consequence of the past, and indicating the more advanced future to which society is hastening. We cannot live by fictions and unrealities. They may prevail temporarily, in conjunction with the real and the true; but by these men maintain themselves on the earth, and by these society is improved. When we say that the Exhibition promotes precise knowledge, we mean that it is hastening for all the dominion of the real and the true. The effect is not confined to England, though more conspicuous here than elsewhere. Amongst the Germans, technological education is already provided for; and, so far as the arts have gone, the Germans are well acquainted with their history. It has been written for the instruction of the young, and is carefully taught them in most schools. It forms a part of their extensive and excellent scheme of instruction. Amongst them are numerous technologists ready made, and several well-informed men and clever writers have been sent hither, and have supplied the German journals with detailed descriptions of the articles in the Exhibition. The French have done similarly, though not so extensively, as the Germans. Both have adopted—though, of course, not equally with ourselves—the plan of illustrating their writings; and the art of the engraver has given *distinctness*, as well as force, to their verbal descriptions. The effects of the Exhibition on literature, therefore, giving increased care in observing minute differences, adding to precision, and spreading a knowledge of realities, will be similar all over Europe—if not so immediately striking in other countries as in England. The phasis of the mind is general as well as permanent; and, whatever may be its consequences, they will not be confined to our own country

We have referred to newspapers as bringing the characteristics of the change under the notice of all; but other literature shares in the influence. The monthly and quarterly periodicals are becoming more scientifically precise and technologically accurate. They discriminate with increased care between the products of different countries and different arts; discuss with much minuteness the merits of reaping machines and printing presses; describe the different qualities of English and French silks and velvets, of Brussels lace and Swiss embroidery; in short, they, too, feel the influence of the Exhibition in making literature more minute and careful, and more attentive to facts. Of the numerous catalogues of the Exhibition requiring an immense amount of minute labour and careful research we say nothing, because the quality of precision is eminently their characteristic. Many of them, like the official descriptive and illustrated catalogue now in course of publication, have well-executed engravings of many of the articles in the Exhibition. The ILLUSTRATED LONDON NEWS has many competitors, but no equal; and all the works connected with the Exhibition necessarily display a minute and careful attention, while they deal only with interesting realities. The mind will be drilled by many charming novelties into a love of facts, and will not readily go back to vagueness, uncertainty, and fiction. Thus educated, the public will require a similar spirit in writings not connected with the Exhibition, and the direction it is now giving to a part of our literature will be more or less imparted to the whole. In truth, knowledge has, from the very first, been advancing from the shadowy and the vague to the definite and the precise; from loose individual perceptions, to firm and general truths; the progress will be accelerated by the Exhibition, which merely gives a fresh impetus in the old direction.

The civilisation of Europe, so far as it depends on religion and science, is, to a great extent, common. If it vary in degree in different countries, it has gone, or is going, through nearly the same phases in all. The sciences of astronomy, geology, and chemistry, for example, and the arts connected with them such as navigation, mining, dyeing, smelting, &c., are common to all the nations of Europe. All the arts of life are founded on some principles common to the whole human race, and are practised in a similar manner. From science being everywhere the same, we draw the inference that the minds of all men are somewhat alike. They everywhere receive similar impressions from the external world. We all recognise at once the objects a skilful painter places before us. From the same circumstance we also draw the inference that the external cause of man's impressions is everywhere the same. In other words, one spirit animates the whole universe, lives in the external world, and moulds the intellect—is adapted to man, and man to it. He comes everywhere gradually to comprehend it in the same manner. There are not two astronomies, two mathematics, or two chemistries—one for England and another for Italy; there are not separate sciences for every distinct country, but only one science for all. This similarity or uniformity of knowledge constitutes the true brotherhood of mankind. They have similar wants, and learn similar means of gratifying them. They have, therefore, a common parentage. Their moral nature is similar, and the external world is the same for all.

These common features and intimate relationship were known before the Exhibition; but it has intensified them all. It has set nothing aside, undone nothing, but confirmed and ratified what before existed. It has especially made evident and palpable to all the universal prevalence of a common industry, directed to similar purposes, and guided by similar rules. The differences between the productions of China and France, of Hindostan and the United States, are not so remarkable to reflecting minds as their similarity. Not only similar arts exist in the most distant countries, but similar inventions have taken place; and—not to speak of the art—of making paper, earthenware, and ships, gunpowder, printing, and bank-notes have all been invented in China as in Europe. The great feature of a common parentage, made plain to all by the literature of the Exhibition, cannot fail to influence the fate of mankind. As the common knowledge of the one external cause extends, moulding the minds of all alike, and as the common wants and common means of gratifying them become known, mankind must become more closely linked together. The friendliness displayed at Hyde Park between Chinese, Tunisians, Germans, Spaniards, Americans, &c., is obviously no fortuitous event, but the necessary result of their common knowledge and common pursuits. From such facts, it is to be inferred that the laws which govern the universe, to which the progress of society is in conformity, are opposed in the long run to the continual political separation of mankind into adverse and hostile nations. We see, in fact, that the separation is lessening and disappearing. The Exhibition has both confirmed the fact, and helped much to explain the law on which it depends. Now, as all legislation and statesmanship look to the future, the Exhibition, with its literature, will be of political value. It proclaims as a great truth, that no legislation can be durable, no statesmanship beneficial, which does not fall in, like the Exhibition itself, with the general progress towards acknowledging and promoting a common brotherhood.

By showing us that all art is founded on common principles, and on sciences common to all, it impresses on us the important truth, that we shall be powerful, wise, and happy, not as we gain victories over each other, but in proportion as we comprehend that external cause to which all science relates. By comprehending it, we obtain its assistance—the assistance of power that is for us wonderful and almighty—or become like unto it. The precise knowledge taught by the Exhibition will much promote this end. It is opposed to chimeras and shams of all kinds. It is a deadly foe to unrealities. Its great attractions fix attention, require close examination, and compel comparison. If there be connected with it, as some persons assert, no little quackery and no little false pretence, its overbearing principle is that of actual precise truth. It subjects the quackery it may excite to the severe test of comparison with the real and the good; and if it give some trumpery a momentary predominance, it is only the more effectually to sweep it away with all that is trivial and worthless. By some persons it is thought—and for the moment it may appear so—that one characteristic of the Exhibition is to exalt the trivial, and give currency to the worthless, and make us rather pleasure-seeking triflers than earnest men, conscious that moral life is a struggle after improvement, and must be manfully contended for. To that supposition, the precision, which is its chief characteristic, will be, in the end, decidedly opposed; and we believe that its permanent effects, totally different from what is expected of it, will be mentally elevating and ennobling.

A great part of the Exhibition consists of luxuries and ornaments—of jewels for the few, rather than of bread for the multitude; but it contains also working models of powerful and valuable machines. Bringing the two together, forces on the mind at once a comparison and a contrast between the merely ornamental and the useful arts. A steam-engine and the Koh-i-noor are placed before us, and we are called on to choose between them. An improved Jacquard loom, or a power-loom that appears instinct with life, or a printing press, arrests attention as well as the sculpture in the Nave and the glittering works in the French department. We depreciate not a single object exhibited, or any product of industry; but these various articles being brought together, the public will judge of them, and form a faithful opinion of their relative value. We submit in the common market a princely estate, a case of diamonds, a cargo of tea, a pound of potatoes, or a handful of cherries, to the test of competition or higgling to determine the value of each; and in all the great business of life we rely on the judgment of individuals. Will the public not then be able to form correct opinions of the utility of a great machine, or a little frippery? and may the rulers and guides of society not rely, with the utmost confidence, on the public mind coming to a sane conclusion? We, at least, trust the public. We believe it will form as correct an opinion of the articles exhibited as of the value of wheat or leather; and one of the great improvements effected by exhibiting many things side by side will be, to improve the general discrimination between the merely ornamental and the useful—between the costly ornaments of a lady's toilet and Mr. Maudslay's powerful steam-engine. Instead of making the spectators in love with finery and charmed with luxury, the Exhibition will give them a high idea of human power, and tend to make them discard trivialities as unworthy of man. We apprehend that it will not only increase careful discrimination between the useful and the merely ornamental, but it will tend to carry out the principle of the latter, and make it more graceful and more beautiful.

As the rule, we may say that the useful arts are the handmaids of the multitude; the ornamental arts, of the few. The former, depending on the increase of population, which makes progress a necessity, are much more rapidly and certainly improved than the latter. Accordingly, while our journals teem with numerous and loud complaints of a general want of taste—of the ornamental arts being neither understood nor appreciated—only admiration is felt for our wonderful mechanical contrivances. The ornamental arts, subserving chiefly the pleasures of the few, have in them something conservative, and they change less and are improved less than the useful arts. In sculpture we are still proud to imitate the Greeks, and rarely hope to attain perfection. In painting we do not surpass the Italians of the Middle Ages. Our carving is, perhaps, less skilful than that of the Chinese; and few of our silversmiths reach the excellence of Benvenuto Cellini. The colours of our garments, their shape and texture, and the ornaments of our houses, are about equal to those of the Hindoos and the Romans. But our power-looms, railroads, locomotives, spinning-mules, telegraphs, tubular bridges, &c., far beyond anything the people of antiquity ever dreamed of, are the pride of this generation. They are our own invention, and we deem them much more worthy of our admiration than the products of arts we have inherited from the rude nations of antiquity. It may be suspected, therefore, that the superiority sometimes assigned to the ornamental and fine arts is more due to their gratifying the tastes of a few, and to an inherited reverence for them, so far as this generation is concerned, than to their intrinsic worth.

Impressing on man the realities of his condition, and bringing into comparison and contrast the results of various arts and industry produced in all parts of the world, the Exhibition will necessarily inspire increased admiration for the wonderful skill that lifts man out of the hard necessities, the mire of barbarous life, and seemingly places him on the vantage-ground of a mastery over nature. It will proportionably abate his admiration for ornamental arts that are worthless; at the same time, placing their products together, as they come from different places, it will facilitate the detection of the principles on which the pleasure they give depends, and help to improve them. The admiration excited by our noble machinery, must make men disdain mere unmeaning trivial ornament, that has nothing to recommend it but its costliness; and we count on the Exhibition, while it increases the knowledge of the true, of the beautiful, and the good, discouraging in the end a number of pursuits that have no other object but to gratify vain and senseless parade.

The moral effects of the Exhibition, and, consequently, of its literature, will be most beneficial. Displaying to man the real sources of his power, teaching him how much he is indebted to the inquiries of the philosopher, the skill of the manufacturer, and the art of the machinist, his reverence will be lessened for all those whose influence over the march of civilisation is by no means equal to their pretensions. Men will form opinions, and the Exhibition will help them to form correct opinions. These are probably more needed at present in the moral than in the physical sciences; and if the habit of precision generated in the multitude from investigating material objects be extended to their political pursuits, their gain will be very great. Abating admiration for mere ornament, the Exhibition is likely, quite contrary to expectation, to lessen the undue desire for wealth as a means of obtaining distinction. Increasing admiration for the useful arts, it will compel the genius and talent of the age to improve them. It seems impossible that the men, who are subduing all nature by their skill, should ever entertain a meaner ambition than that of continuing their success. As the warriors of old, proud of their strength, and continually impressed by hostile conflicts with the superiority of war to all other arts, gave up the distaff and domestic employments to the women so must this generation and its successors, proud of the arts which improve society, proud of the command which knowledge, skill, and powerful machinery give man over nature, chiefly honour them, and slight a thousand trivial claims that are now made on their respect. With such noble objects to interest the feelings of men, vulgar ambition will pale its fires; and the highest talent, proud only of conquests over matter, will cease to aspire to enthral the minds and bodies of its fellow-men. The common and great power over the material world, the result more of the general mind and general progress than of any one individuals' skill, seems almost synonymous with equality in society; and we may look to the Exhibition, however unexpected may be these consequences, to diminish ruinous ambition as well as a ruinous love of wealth. As the teaching minds of society are devoted more and more to the useful arts, society will disregard practices that have now no other recommendation than that they were suitable to a former condition of society, when men lived predatory lives and had to fight for the means of subsistence. In all moral questions as well as in questions of the material world, in questions of government as well as questions of education, and regulating creeds, as well as sowing corn and navigating ships, the Exhibition, by enlarging man's knowledge of science, will make him more careful to study and obey the laws of the universe. Giving much delight to rich and poor, foreigners and natives, the Exhibition, sharing the attributes of nature, has improved the species by means of enjoyment. Taking place at a time when there is abundance in the land, and when the people generally are profitably employed, without which, in fact, it could scarcely have succeeded, it is not only a great present benefit, but it teems with physical and moral improvement hereafter. We do not say that it is a harbinger of a golden age, but it forms part of a period of very great peace and happiness, which it promises to continue and to increase. It is the townspeoples' child, rather than the child of the rural population; the offspring of trade, rather than of politics—of a population which is growing, and of principles which are just come, or coming into the ascendancy, rather than of a population which is stationary or principles which are falling to decay. We may count, therefore, on a further and continued increase of all its benefits. The literature that has grown from it, and describes it, and makes its existence known to many millions who are denied the pleasure of seeing it, must be very influential both now and hereafter. To draw attention to that literature, making it, we hope, still more influential and more worthy of the great cause to which it is devoted, is the object of the task now concluded.

PRIEST'S DRESS.—BY VAN HALLE, BRUGES.

PRIEST'S ROBES. HALLE.

Another of the embroidered priest's robes, by Halle, of Brussels, will serve to show the variety of device lavished upon these garments.

SEWELL'S BOBBIN NET MACHINE.

Perhaps the finest collection of net machines in this country, and which we have had the opportunity of seeing, is that at Tiverton, belonging to J. Heathcoat, Esq, M.P., who was the first to produce a practically useful bobbin net machine.

Many other persons also have exercised their ingenuity and skill in effecting useful novelties in this particular class of machinery; among others we may mention Mr. T. R. Sewell, of Carrington, near Nottingham, who contributes to the World's Industrial Display what is called a "double tier machine," in contradistinction to the "single tier machine," in which only one "row" or "tier" of bobbins and carriages is worked at the same time; whereas, in that under consideration, two tiers of bobbins and carriages are worked simultaneously. This machine contains 2460 bobbins and carriages, each bobbin containing about 100 yards of thread; an equal number of threads proceeding from the warp beam are brought into operation, round which the bobbin threads are twisted by means of the forward and backward motion of the bobbins and carriages.

Besides the motion of the bobbins and their carriages "to and fro" between the warp threads, they have another motion to the right and left, by means of which the bobbin threads are made to cross each other: this operation gives greater stability to the net, even if made of thread of very fine quality. When the bobbin threads have been twisted sufficiently round the warp threads, and have also crossed each other, as already mentioned, a set of steel points descend, and take up the twisted and crossed threads, and put them into the form of meshes; and thus, by continually repeating these operations, a piece of net is produced equal to 150 yards superficial, the quantity of twisted thread consumed for this purpose amounting to 246,000 yards. The size of the piece is, of course, regulated by the number of bobbins employed, and the length of thread on each bobbin. When a piece of net is completed, the bobbins are re-filled with thread, ready for a repetition of the operations described. The advantages of Mr. Sewell's bobbin-net machine are—first, its simplicity and economy of construction; secondly, its efficiency while in operation; and, lastly, its facility of management.

COLLINGE'S HORIZONTAL SUGAR-CANE CRUSHING MACHINE

The name of Collinge is well known, especially in connexion with axletrees and hinges. In the department of the Great Exhibition devoted to "machinery in motion," we find exhibited by Messrs. Charles Collinge and Co. "an improved horizontal sugar-cane crushing machine," two screw lifting jacks, and a portable direct-acting high-pressure steam-engine.

Several machines for crushing the sugar-cane are to be found in different parts of the Building, including the gigantic apparatus of Messrs. Robinson and Co., of the Isle of Dogs. In Messrs. Collinge's cane-crushing machine, a vertical shaft is so arranged that power may be received either from a windmill, from cattle, or, if desirable, from a steam-engine; on one side is the "feeding board," on which the cane is first placed, and thence passing between three rollers is so completely crushed as to express the juice, which falls into a trough placed underneath the rollers, from which it is conducted by suitable pipes to the boiling-house. The amount of compressing force may be regulated to great nicety, by means of a screw adjustment acting on the bearings of the rollers.

THIS SHEET WAS PRINTED IN THE GREAT EXHIBITION.

A LADY'S GLANCE AT THE GREAT EXHIBITION.

No. IV.

In my last paper I endeavoured to give my readers some idea of the character and value of those precious stones in the Crystal Palace which owe their principal interest to their extreme size, rarity, or intrinsic worth. I propose, therefore, devoting my present attention to the examination of the jewellery exhibited in ornaments designed for ladies, and of which so noble a display may be seen in its various courts and galleries. The chief attraction of this class will be found in the taste and ingenuity which has been employed in the setting and arrangement of the stones; and nowhere shall we find stronger evidences of the additional beauty and enhanced value which can be given to the most exquisite works of the Creator, by the intelligence which he imparts to his creatures, than in the various depositories of this branch of art in Class 23. The variety of design displayed in the construction of the same object, which is one of the most interesting features of the Great Exhibition generally, is peculiarly exemplified in the various specimens of *bijouterie* presented there, in the shape of ornaments for the head, necklaces, bracelets, Sevignés, shawl-clasps, &c. The simplest forms with which we are familiar, in every-day life, and to which, from that very familiarity, we have hitherto scarcely been accustomed to associate the idea of beauty, vie here in arresting our attention with the most graceful combinations and elegant "conceits" which could be devised by the most fruitful and tasteful imagination. Here we shall find, in miniature, adapted to purposes of decoration never contemplated by their inventors, the graceful curves of the Gothic architects, and the fanciful arabesques of the Moor. Here may be observed designs which our great-grandmothers voted old-fashioned a century ago, but which time, strange to say, has endowed with the grace and charm of novelty. Here are *moyen âge* decorations, reminding us of the pictures of Holbein and the carvings of Cellini; nay, with a still more remote retrospect, for we may henceforth fasten our shawls with the *fibula* of the ancient Milesian chief, or encircle our arms with similar decorations to those which (ages ago) delighted the ladies of the court of King Rameses or the hapless daughters of Nineveh! Of all the varieties of design, however, which are presented to our sight, beautiful as they are, it is to those which we derive directly from the world of nature to which we shall be found to recur most frequently and with the greatest pleasure; and in these the refined taste of the present day has rendered the Exhibition peculiarly rich. The flowers of the garden, the leaves of the forest, the herbage of the field, the plumage of the bird, present here many of the most beautiful combinations of form that could be devised for ornamental purposes—

> To add a grace to what was fair before,
> And give to beauty one attraction more.

The exhibition of jewellery as applied to ornaments for ladies exclusively, is confined for the most part to the departments of England, France, Russia, Holland, and the Zollverein; and, I think, it cannot be denied, that, as a whole, the substantial value and sterling character of that exhibited by our own countrymen may fairly be said to bear away the bell.

The English jewellery, with the English plate, is to be sought for at the western end of the South-western Gallery, and thither will we first direct our steps. A short distance eastward of the top of the staircase is the large case of gold and silver plate of Messrs. Hunt and Roskell (late Storr and Mortimer); and at the further side of it we shall find the exquisite specimens of jewellery exhibited by that firm, and which, for extent, variety and beauty of design, are not to be equalled by any in the Exhibition. The first object that will strike the eye from its position will probably be a portrait of her Majesty, painted in enamel from the well-known picture of Winterhalter, and exhibiting with much truth the characteristics of the original. It is not with the picture, however, that we have to do. Surrounding it within the case in which it is set is a wreath of oak leaves in green enamel, with acorns of gold and of pearls, enriched with diamonds and fastened at the stem with a ribbon of brilliants. Underneath this picture is exhibited the much-talked of bouquet of flowers in diamonds belonging to the Queen, and of which an Engraving and description were given in the ILLUSTRATED LONDON NEWS of July 26th. In the exquisite arrangement of this design, the perfectly natural position assumed in it by the smallest bud and most unimportant leaflet is remarkable, as well as the lightness of appearance given to materials so apparently impracticable. What a contrast does it not present to the stiff, hard, heavy-looking patches of jewellery, framed as it were in formal squares, ovals, and circles, which formed the adornment of the *élégantes* some hundred years ago. On the right side of this bouquet is a necklace of emeralds of great beauty, ornamented with pendents of alternate pearls and emeralds, of which an Engraving has also been given; but what representation in black and white can do even partial justice to anything so graceful and so brilliant? A large collection of bracelets ranged above these specimens is worthy a long examination; one, of opals, more especially. It is formed of stones, which, though not very large, are remarkable for their beauty, and almost seem to combine in themselves the unobtrusive beauty of the pearl with the subdued lustre of every coloured gem beside. On the right of the set of emeralds, and as a sort of pendent to it, is a very elegant suite, comprising a tiara of "rubies unparagon'd" and diamonds, a throatlet and stomacher of the latter stone only, of large size and of pure water. Moving round to the left-hand side of the case we shall find a *parure*, which, for interest and beauty, appeared to me (though among so many bewildering attractions I hardly know whether or not I am right) the gem of the whole collection. It is a necklace, stomacher, &c., composed exclusively of diamonds, but of every shade of colour; the dark blue of the sapphire, the light purple of the amethyst, the orange of the topaz, and the olive-green of the peridot, with many of the most delicate intervening shades, the lightest azure, the faintest primrose, the palest pink, all displayed in various descriptions of diamonds. The stones of which this suite is composed are from the collection of the late Henry Phillip Hope, Esq.; and, possessing, as it does, the double advantage of that diversity of colour obtainable by an assortment of various stones with the lustre and brilliancy to be found in the diamond alone, this set of ornaments is, unquestionably, in its own peculiar walk, utterly unrivalled by any *parure* in the Exhibition.

Difficult as the imitation of flowers in gems would appear to be, a still greater ingenuity would seem to be necessary in the formation of another ornament, which will be found on a cushion immediately above the set just described, and which is simply a decoration for the head, composed of fine brilliants arranged in the form of an ostrich feather! The wavy appearance of the original, which would seem utterly unattainable in materials of so inflexible a character, is given by an ingenious arrangement of the stones in what may be called ribs, and thus affording, when agitated by the movement of the wearer, that "swailing of the feather," to use the words of a well-known poet, so beautiful in nature. The mode in which it is displayed does not, however, enable us to form a judgment of the complete success of this charming device. A necklace and stomacher of diamonds on the left is worthy of note, if not for any novelty of design, at least from the size and lustre of the stones. Above it is a head-dress of rubies and diamonds, representing a sprig of roses; the chief beauty of which is its extreme lightness. It would not, however, be the less effective if exhibited on a frame-work of more elegant device than the skull-cap that has the honour of bearing it. Many brooches of many kinds are exhibited, which in any other collection would have called for especial notice; but we have been so richly regaled with the beautiful, that nothing short of some very extraordinary attraction could succeed in awakening a renewed attention. Before, however, quitting this assemblage of the "rich and rare," we must not omit a glance at those large jewels at the extreme left—among them a brooch, consisting of one sapphire considerably larger than a crown piece, and stated to be the finest specimen of its class known. Beneath this, and belonging to it, is a small sapphire set in a knot of diamonds, with another even more beautiful depending from it as a drop; and with this description we must conclude our notice of Messrs. Hunt and Roskell's chief treasures.

The next object to arrest our attention on continuing our walk eastward, is the collection of Messrs. Garrard, of the Haymarket, which in beauty and value is only second to that which I have just left. Before, however, commencing an examination of it, let us turn back for a few moments, and glance at one or two unobtrusive cases, which, in our eagerness for a glimpse of the "gems of price," we have passed unnoticed, and may therefore otherwise altogether overlook.

On the left-hand side, near the outer railing of the Gallery, Messrs. Waterhouse, of Dublin, have devoted a case exclusively to the exhibition of Irish brooches, which, from their peculiarity of design, rather than from any remarkably beauty, are worthy of especial attention. They are composed of gold, silver, and of bronze, ornamented in some instances with malachite and other stones, and designed from antique originals, which the zeal and industry of archæologists have from time to time brought to light in various parts of the sister kingdom. They are for the most part in the shape of the letter C, with pins running through the centre from top to bottom. There is one of large size, and more elaborate ornament than the rest, which is perhaps most worthy of attention, as being the finest type of the class; it is named the Royal Tara Brooch, from the circumstance of its having been designed from a brooch of extreme antiquity recently discovered near Tara, in the county of Meath: it is of bronze, of circular shape; the lower half is occupied by a variety of ornaments in niello and Irish gems. Beside it is the original brooch from which it is designed, which is in excellent preservation, and testifies to the taste and skill with which the makers have preserved the characteristics of the type, whilst somewhat modifying its details to fit it for modern use. In a case on the right-hand side, Messrs. West and Co., of Dublin, also exhibit brooches of a similar description, but somewhat smaller in size. One of these may be instanced as interesting, from its being composed entirely of native material, the gold being the product of the Wicklow hills, and the stones with which it is ornamented Irish pearls and sapphires. In the same case, a curious fibula, or button, also of Irish gold and gems, is worthy of notice, as having been presented by the citizens of Dublin to Miss Helen Faucit. These ornaments, though rugged in character and heavy in form, have an interest of their own in a sturdy antique Druidical dignity of appearance, which renders them scarcely less attractive than the light and modern decorations by which they are immediately surrounded. Messrs. Rettie and Sons, of Aberdeen, may be said to represent the department of the modern antiques of Scotland, in brooches and shawl-pins, in an adjacent case. Messrs. Martin, Basket, and Co., a little more westward, exhibit, among various ornamental designs, an elegant toilet stand, which they term the Princess Royal Toilet. It is about the size of a small dressing-case; is made of silver and gold enamel, and is ornamented with delicate golden butterflies. The small looking-glass attached to it is framed in silver and gold; and the whole is one of the most elegant little *bijoux* for a little lady that could well be imagined.

Let us now return to the jewellery of Messrs. Garrard. In the centre will be found a beautiful tiara of diamonds, with drops composed of fine pearls, and a Sevigné to match. Beneath this is a suite of opals, set with brilliants, comprising necklace, stomacher, ear-rings, and bracelets. The opals are twenty-five in number, of unusual size and great beauty, being, with the exception of one in the necklace, entirely without flaw, and presenting, under every fresh phase of light, all the most delicate colours of the prism. These are, unquestionably, the finest of this description of stone to be met with in the Exhibition. On the right is a delicate suite—necklace, brooch, and bracelet—like the coronet of Sir Palamon of the legend—

> With sparkling diamonds and with rubies set.

The specimens of the latter stone are more than ordinarily large and beautiful, and the whole is noticeable for extreme elegance of design. On the left side we observed a similar *parure*, somewhat larger and heavier in character, of sapphires, diamonds, and pearls. Beneath which is a bracelet, which I notice chiefly from the apparent popularity of its pattern—several of similar character being exhibited in other parts of the Building. It consists of a series of broad rings of diamonds, interlaced one in the other, increasing in size till they reach the centre, which is filled by a large ruby. On the right side of the case is a pearl drop of remarkable size and regularity of appearance; but possessing an interest tenfold beyond its actual value, in the circumstance of its being a relic of one of the most distinguished women that ever lived. It is stated to have belonged to the Spanish Queen Isabella of Castile, the steady friend and patron of that great man, who as his epitaph expresses it, for Castile and Leon discovered a new world—Christopher Columbus. It is now the property of the Marquis of Abercorn. Not far from this gem is a Sevigné of diamonds and emeralds, with drops of the latter stone, and some elegant bracelets of various devices, one of which will be noticed as containing an oblong ruby of remarkable size and purity of colour. The collection of Messrs. Garrard, on the whole, though less extensive than that of Messrs. Hunt and Roskell, contains as may be seen, some objects of unusual interest; and the lightness and elegance with which they are arranged seems to me to give them more of that character which we shall have occasion to admire in the French department, than perhaps will be found in any other case in the South-western Gallery.

Among the wealth of plate exhibited by Messrs. Emanuel (119) will be found a few ornaments also, two of which especially (though of somewhat formal design) struck me particularly—the one a bracelet composed of broad rings of diamonds interlaced one in the other, similar to that I have noticed as exhibited by Messrs. Garrard, with an oval emerald of great size and lustre in the centre; and a small diamond-shaped brooch, divided into chequers of rubies, each square separated from the other by rows of brilliants, having something of the effect of a harlequin's coat. The admirers of the deep rich colour of the carbuncle will find two fine specimens in a brooch and pendent in this collection. A bracelet is also exhibited of plain gold, interesting from the circumstance that beside it are placed specimens of the gold of which it is made, in its various stages, from its original state to the links worked up and completed for the bracelet. First the ore, unremoved from the rock; then the fine gold, the ingot gold, and the plated gold. The observer will not fail to remark the deterioration of the metal necessary to fit it for working up into forms of elegance for the wearer.

The next objects claiming notice are those belonging to the Messrs. Rowland, which, although they comprise but four or five ornaments, and the stones composing them are not remarkable for peculiar beauty, the arrangement and designs are so infinitely superior to any we are in the ordinary habit of seeing as to arrest immediate attention. The first object is a bracelet, set with rubies, in gold, distinguished by the exhibitors as the "Holbein Bracelet," and displaying much of the character we are in the habit of noting in the pictures of that period. The rubies are arranged in three rows of what are termed, in heraldry, lozenges, each surrounded by a narrow border of brilliants. So far as regards beauty of design, this bracelet has few equals in the Exhibition. There are three brooches in this way hardly less beautiful, one of which has a large carbuncle for its centre decoration, surrounded by brilliants, supported by little Cupids, and surmounted by a guardian angel with outspread arms. Another bracelet seems designed from a lady's stomacher, also of rubies, and is very elegant. This small collection is perfect of its kind.

The Messrs. Morel exhibit a bouquet of flowers of brilliants and rubies, the elegant arrangement of which will be familiar to our readers, from the Engraving lately given of it in the ILLUSTRATED LONDON NEWS.

Having attempted to do justice, however imperfectly, to the claims on our admiration afforded by the taste and ingenuity of our own country men in this department, let us now proceed to the eastern end of the ground-floor, where our Continental neighbours display their treasures. On the southern side of that quarter will be found the collections of the French jewellers; and to them, as the nearest and most important, we will first direct our steps.

Looking upon the Nave, a short distance beyond the Swiss department, is a small case of *bijouterie* exhibited by the Messrs. Leimonier, of the Place Vendôme, Paris, which is familiar to most persons as being the depository of the jewels of the Queen of Spain, and which, from its favourable position, no less than the exquisite beauty of its contents, has been one of the most attractive displays in the Building. It is, however, just now entirely hidden from our sight by the crowd of eager admirers that surrounds it. That lingering enthusiast of the beautiful who stands before us seems tempted to encroach somewhat on the time strictly due to her neighbours; but who can resist the pathetic appeal of that prince of guardians, in the guise of a policeman, who stands at that left-hand corner? She looks as Eve might have done on quitting Paradise; and, for a brief space at least, the vantage-ground is exclusively our own. The first object we shall notice when our general curiosity is sufficiently gratified to allow us to descend into detail, will probably be that tiara of sapphires surrounded by diamonds, with pendents of the same, interspersed with pearls, which is exhibited to advantage on a velvet helmet on the left-hand side of the compartment. There is something peculiarly beautiful in the deep pure blue of the sapphire, and as, from some cause or other, we seem to see it less frequently imitated than the diamond and the emerald, it possesses a freshness which gives it a peculiar attraction. The specimens of this ornament are remarkable for their size and lustre, and, with the exception of the sapphire exhibited in a brooch by Messrs. Hunt and Roskell, to which I have before alluded, are probably the finest examples of this stone in the Exhibition.

Our attention now turns to a *parure* of higher value, and, it must be admitted, of even greater beauty. It comprises, first, a bouquet consisting of diamonds in the form of flowers, something similar in character of arrangement to that which I have already noticed in the English department, but set with a drooping springy lightness peculiar to itself. The flower-buds are composed of pearls, and the leaves of emeralds, the whole set on springs so quiveringly tremulous that every movement presents them in a new and more beautiful point of view. So large are the emeralds, that, but for their intrinsic brilliancy, they might at a distance be mistaken for some new kind of enamel of peculiar beauty. The gathered stems of the flowers are apparently confined together by a ribbon of diamonds. Near this exquisite ornament, and forming part of the same suit, is a head-dress of emeralds of the same extraordinary size and beauty, surrounded by pearls and diamonds, and comprising, it is said, upwards of 8500 stones. A bracelet, necklace, stomacher, and shoulder-knot complete the suit. Before yielding our place, we must take a glance at that bracelet, composed of two precious stones, which, from the extreme beauty of their colour, have been generally mistaken for rubies, and have been thus described in more than one journal. They are, however, not rubies, but carbuncles of remarkable size and excellence, and are stated to have been purchased by her Majesty. A brooch and pendent of pink pearls in the same case are also worthy of notice.

Having finished my survey of the Spanish jewellery, I next turn to that exhibited by Froment Meurice, of Paris, who also displays a bouquet of smaller size than the one to which I have alluded above. It is formed chiefly in diamonds, representing roses full blown and in bud, the petals of which have a mixture of rubies among them. The convolvolus, so effective in every style of decoration, and the pendent fuschias, with their ruby drops, are of remarkable beauty; the usual ribbon of diamonds, with three tassels, complete this ornament. Near it a brooch, to match, is to be seen, composed of flowers full blown. In the same compartment will be found a Sevigné of large pearls, representing grapes, with leaves and drops of diamonds. The admirable manner in which the irregular and crumpled appearance of the leaves (as in nature) is represented is especially worthy of remark. A brooch of rubies and brilliants, in the form of a carnation, with buds and leaves, in the same collection, is also exceedingly effective.

There is another object exhibited by the same firm, which occupies deservedly so prominent a position that it will probably attract the eye, even before the specimens of jewellery of which I have been speaking. Though professing to come within the category of the useful, it is so essentially ornamental in character, and appeals so directly to the taste and sympathies of ladies in general, that I cannot make up my mind to pass it by without a few words of description. This is a toilet table, silver gilt, adorned with carving and enamel, and presented by the Royalists of France to the last direct female representative of the good King, Henri Quatre, the Duchess of Parma, on her marriage. The various articles comprised in this toilet are a mirror, two jewel caskets, a ewer and basin, two girandoles, and the table itself. The mirror, in the form of a Gothic arch, is set in an ornamental frame of the *Rénaissance* style, round which are enamelled the arms of all the ancient provinces of France. On the right and left are the supporters of France and Lucca, bearing the banners and devices of their respective countries. These figures are represented as leaning against two giant lilies, at the base of which are groups of young children. The inscription—"Souvenir de France, 10 Novembre, 1845"—is engraved on the lower edge of the mirror. The jewel caskets are ornamented with twenty enamel portraits of women most renowned in the annals of France: among the number who have been deemed worthy this honour may be instanced Jeanne d'Albret, Joan of Arc, Ste. Géneviève, Blanche of Castile, Anne of Brittany, Jeanne la Boiteuse, and Anne of Beaujeau (so well known to us through the pages of "Quentin Durward"), Ste. Bathilde, Jeanne de Montford, Jeanne Hachette (the peasant preserver of Beauvais), Clemence Isaure, and Margaret of Valois. At the corner of the caskets are placed statuettes of eight youthful pages, representing the flower of French chivalry, whose individual likenesses have in each instance been preserved as far as possible, all of which have been taken from authentic portraits. The design of the girandoles is of remarkable beauty, representing clustres of lilies, round which are entwined garlands of roses, and "ivy never sere." The table itself must by no means be forgotten, although its many beautiful accessories deprive it of some share of the importance due to it in the mind of the beholder. Its length is about six feet; its outer surface is composed of large silver plates enriched with gold, placed in incisions expressly made for the purpose in the single plate of steel which forms its foundation. Its ornaments are *fleurs de lis*, roses, and ivy; and on a ribbon is inscribed the circumstances under which it was presented. Most grateful must such a *souvenir* have been to one whose earliest years were passed in exile from her native land, and whose first remembrances must have been the sorrows of her family. Four years were, it is said, employed in the construction of this magnificent piece of workmanship. Its estimated value is about £6000.

Madame Rattée, of the Rue Pavée Ste. Sauveur, Paris, exhibits a bracelet, composed of three rows of diamonds, set clear, increasing in size as they approach the centre, which is filled up by a large ruby encircled by brilliants. This work, though not ornamental, is said to contain ninety-two diamonds of great value.

The case of M. Bouvenet, of the Rue de Hauteville, contains some very charming specimens of enamel, particularly a bracelet, with ear-rings and brooch to match, in imitation of twisted ribbon. Also a Sevigné of blue enamel, adorned with long pendents set with diamonds, which hang down to the point of the dress, and which can be removed at pleasure, and formed into brooch, bracelets, hair-pins, and ear-rings. A bracelet of the plain old Greek pattern, so popular at the beginning of the present century, and so beautiful in itself, will also claim a passing glance.

Crossing the Nave, and entering the department of the Netherlands, we approach the small case (104), of M. de Romain, of Rotterdam, the only exhibitor of ornamental jewellery of Holland. We here meet with a magnificent corsage or *pointe* of diamonds, representing bunches of flowers. In the centre, ornamented with fourteen beautiful pearls, is a small medallion portrait of her Majesty, in her robes of state, very finely executed; from which depend four chains of diamonds. By fastening these chains to the principal ornament, a *coiffure* is obtained for the head; and, by another transposition, the whole may be changed into a *chatelaine!*—perhaps the most valuable that was ever constructed. On the whole, it is a beautiful piece of jewellery, though of rather a heavy character.

Our next visit is to the Russian collection of jewellery, with which we must conclude our notice, and which, though not very extensive, presents attractions of no common order; among which, a magnificent tiara of diamonds and emeralds must be especially particularised, the latter stones of which are of large size, and fashioned into a smooth round form, not very unlike the shape of a rose-bud. This comparison may serve to give an idea of the setting; for, as a rose-bud is attached to its stem, in like manner are these beautiful stones attached to the sprays of which they form the extremities. This clear style of setting, objected to by some persons as rendering the jewels lighter in colour, enables us better to see and appreciate their size and quality, and adds to our confidence of their high perfection. The other *parure* in this case, of great beauty, is a necklace of diamonds and rubies, representing six drooping branches of currants, the leaves of which are diamonds. There are also two diamond sprays for the bosom, representing the elegant convolvolus, with its heart-shaped leaves and twisted tendrils. It is almost superfluous to add that their value is pronounced to be immense.

In search of further elegances of the same description, we have no long space to traverse; for in one of the rooms appropriated to the Zollverein we meet with a rich assortment of bracelets, brooches, &c., which, although presenting a less striking *coup d'œil* than those above alluded to, offer individual specimens decidedly worthy of attention. A brooch and ear-rings *en suite* (No. 140) are rather peculiar in design and of great elegance: each ornament represents a grape-leaf, about an inch and a half in size, which is closely studded over with small rubies of varying shades of colour, reminding us of the original leaf in its half faded state. It struck me as remarkably novel in design. Another beautiful set, of gold, opals, and green enamel, is very striking; though two massive bracelets of frosted gold claimed a longer look of admiration than many other rivals of higher pretence. The chief adornment of one is that of two oak-leaves entwined together, between which are two acorns of single emeralds. The part that encircles the arm is supposed to be a small twisted oak branch, so perfectly is the original idea carried throughout. The companion bracelet is entirely of gold, also wrought into a cluster of leaves, from which a little Cupid seems struggling to free himself. A brooch, representing a combat between a lion and a serpent, set with diamonds, should also be here particularised. A small round case (411) contains much that is beautiful; one division of it is appropriated to brooches of plain gold, generally of twisted forms; another is of the same description of ornament, with red coral introduced. Where all are so deserving admiration, it is difficult to distinguish the most beautiful; but one, representing a large serpent, is remarkable for its great resemblance to nature: it seems to have coiled itself naturally, but most artistically, round a very picturesque branch of coral. Another bracelet represents a serpent and lizard: the latter is so perfect in form and colour, that a lady must be endowed with a strong love of the odd and curious in jewellery not to feel a shrinking repugnance in placing it on her arm. It is worthy of minute inspection, from its singularity, if not for its beauty. I could almost fancy it to have been the cherished ornament of some Egyptian priestess. Many beautiful ornaments for the person in oxidised silver are scattered over various parts of the Exhibition, to which we have only room thus cursorily to allude; and in taking our leave of the jewellery therein exhibited, it is with a conviction that so varied an amount of treasures of this description can never again be collected under one roof, either in our own or in any other country.

GROUP OF CHINA.—BY MESSRS. DANIELS.

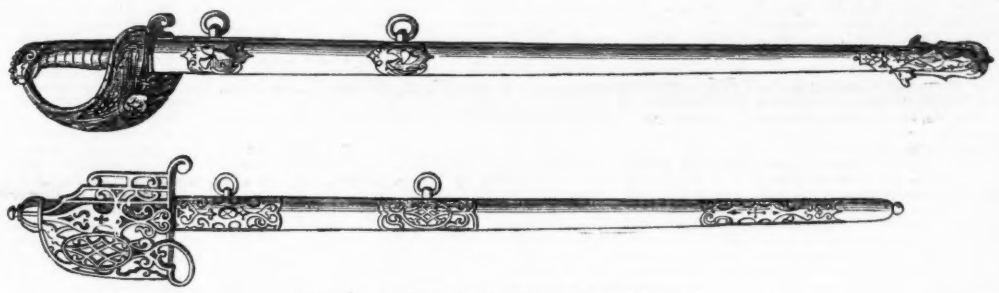
GLASS.—BY J. NAYLOR, PRINCES-STREET.

PORCELAIN. EXHIBITED BY DANIELLS.

The manufacture of porcelain is of comparatively recent date with us; it being not yet a century since Mr. Cookworthy, of Plymouth, after drawing attention to the great clay deposits of Cornwall, eventually removed to Worcester, where he established what has since grown into a highly important branch of manufacture. The displays of British porcelain, both of the tender and of the hard or semi-vitrified kind, are abundant and extremely interesting, whilst they are in the highest degree creditable to the industry and enterprise of their producers. In our present Engraving we give a group of different objects exhibited by Messrs. Daniells, executed for them by Messrs. Rose, at the Colebrook Dale china manufactory. Messrs. Rose have had the good fortune to discover the once-celebrated rose Dubarry, a pale pink employed upon Sèvres china, and so called after that favourite mistress of Royalty. There are several beautiful specimens of this delicate colour in the works before us, intermixed with other colours and gilding in the richest profusion. The forms of the various articles are, for the most part, extremely elegant. (See also page 127.)

CLARET JUG AND GLASS. BY W. NAYLOR.

Amongst the very handsome display of table glass sent in by Naylor, of Princes-street, is a claret jug and glass, cut in devices in honour of the Prince of Wales. The manufacturer has sent us a detailed description of these articles, which we may as well give in his own words, as a matter of historic curiosity in connexion with the Exhibition:—"In the centre of jug his Royal Highness the Prince of Wales, in sailor's attire, leaning against a rock, which represents the firm foundation o Briton. In his left hand he holds the British flag, in his right hand the full blown rose, representing England. At his feet is a dog, looking up to the Prince, denoting the confidence and fidelity of British subjects. To the left of the Prince is an oak tree, in full bloom, with the ivy clinging to it, showing the strength of the English constitution, and the attachment of the people towards it. The rays shining upon, and the hand from behind the tree dropping a wreath of laurel, denote the eye of Providence smiling, and the hand of Providence crowning the Prince with prosperity. On one side is a wreath of grape-vine and laurel, emblematical of the flourishing and victorious state of the



SWORDS.—BY REEVES, GREAVES, AND CO., BIRMINGHAM.

SIDEBOARD.—BY MESSRS. JOHNSON AND JEANES.

country, anticipated during his reign, in the centre of which is his coat of arms. Opposite is a wreath of oak and ivy, denoting the stability and devotedness of the English people. In the centre of this, a group of rose, shamrock, and thistle firmly tied, representing the union of the three kingdoms, descending upon which is a dove with an olive leaf, denoting peace with the world. In the centre of neck, a bunch of forget-me-not, the remaining part of neck filled up by a leaf from every plant represented on the jug." We have only to add, that the glass employed is of first-rate colour and quality, and the workmanship unexceptionable.

SWORDS. BY REEVES, GREAVES, AND CO.

Messrs. Reeves, Greaves, and Co., of Birmingham, exhibit a large assortment of swords of various kinds, intended for general use. They are extremely well manufactured. The two which we engrave are a Scotch claymore and an ordinary cavalry sword.

SIDEBOARD. BY JOHNSON AND JEANES.

The mahogany sideboard exhibited by Messrs. Johnson and Jeanes, of Bond-street, is a very handsome production, of admirable workmanship. The supports are boys, with grapes, &c., resting respectively upon a lion and a tiger. The mouldings along the edges are very bold, and carefully finished.

IVORY THRONE, &c. EAST INDIA COMPANY.

This magnificent throne, of carved ivory, is one of the chief attractions, recently added, of the East India Company's tent. The carving, both back and front, is most elaborate, and of exquisite finish; the seat and back being covered with rich green velvet embroidered in gold. The footstool is of like materials and workmanship. The chairs on either side are beautiful specimens of Bombay carving, in black-wood, the boldness and lightness of which are equally remarkable.

IVORY THRONE, EXHIBITED BY HER MAJESTY; AND TWO CHAIRS OF BLACK-WOOD, IN EAST INDIA COMPANY'S TENT.

GIRL PRAYING. BY J. A. M'DOWALL, R.A.

This is a pleasing little subject, agreeably treated in marble by Mr. M'Dowall. It stands in the South Transept.

PARIAN. BY ROSE AND CO.

In addition to the porcelain by Messrs. Rose and Co., of Coalport, represented in the opposite page, we have engraved their large group of "Pleiades adoring Night," which we have already characterized as elegantly treated (See page 127). On each side of the group is an ornamental piece of the same beautiful material, both of elegant design.

GIRL PRAYING.—BY J. A M'DOWALL, R.A.

HOLTZAPFFEL'S LATHES.

In addition to the numerous beautiful specimens of turning contributed to the Great Exhibition by Messrs. Holtzapffel and Co., and which we alluded to in a former notice, this eminent firm has recently added a valuable rose engine, for ornamenting turned surfaces, and also a lathe for ornamental turning, both of which are now shown in operation in the Machinery in Motion Department. It is rather singular that there are no other machines at work in the Crystal Palace applicable to this peculiar branch of art. The rose engine is very completely fitted with a variety of apparatus, such as a compound sliding rest, segment engine, oblique motion, eccentric, oval, straight-line, spherical, geometric, and many other chucks; which are employed either independently or in combination with each other, with or without the rose engine movement, which in itself is a prolific source of elegant embellishment. The results of these combinations present infinite variety of most curious and highly ornamental patterns, somewhat similar to those of ornamented watch-cases, but of a much more elaborate description.

The lathes for ornamental turning exhibited by the same house are fitted in an equally complete manner, not only with the various chucks already mentioned, but also with other apparatus, as vertical, horizontal, universal, eccentric, and elliptical cutting frames. In this class of instruments the tools revolve, while the work under operation remains stationary; being the opposite condition to that usually observed in ordinary and rose-engine turning. In some instances a still larger amount of elaborate work is produced by putting both the work and the tool in motion at the same time. And when, in addition to these powers of combination, it is considered that the tools themselves are made in every variety of form, it will easily be conceived that the apparatus is capable of producing an unlimited number of different figures, applicable both to the production of forms and the embellishment of surfaces.

We especially call the attention of visitors to the Crystal Palace to the numerous beautiful specimens, exhibited by Holtzapffel and Co., of ornamental turning, as executed by various amateurs, comprising

PARIAN.—"THE PLEIADES ADORNING NIGHT," ETC.—BY MESSRS. J. ROSE AND CO.

temples, mosques, pagodas, candelabra, vases, jewel-cases, work-boxes, and many other useful and ornamental articles, which illustrate at the same time the taste and skill of their respective authors, and the excellence of the mechanism by which they were produced.

Although of far less importance in a mechanical point of view, the compact arrangement of the several parts, and the general finish of the entire apparatus, is worthy of notice. The lathe frames are substantially made of polished mahogany, with nests of drawers, in which are placed the tools most frequently required for use; and when not required for use, the whole is secured by a cylindrical cover.

CHEMISTRY.

(FOURTH NOTICE.)

RETURNING to the Great Exhibition for another batch of chemical suggestions, we notice the glass extremities knocked out for the sake of establishing a better ventilation, a function which appears to have been inadequately provided for by the constructors of this edifice. Ventilation has been designated by the German traveller, Kohl, as one of the favourite crotchets of the English, and many amusing jokes he makes on this peculiarity. Well, we own to the crotchet, if crotchet it be—of advocating a very perfect ventilation. There is something in the constitution of an Englishman which abhors foul, used up, vitiated air, as nature before the time of Galileo was said to abhor a vacuum; and he can no more bear, without subjecting himself to a head-ache, the close stoves of the Germans, Belgians, and especially Russians, than a trout can bear salt water, an ancient coquette the reflection of her wrinkles, or Colonel Sibthorpe the Exhibition. The fact is, we are trained to appreciate a good supply of air from our very infancy, by the nature of our open fire-places; so that any accumulation of vitiated air becomes painfully oppressive.

Singularly enough, we find, on examining the contributions to the stove part of the Exhibition, a foreigner coming forward to aid the English in perfecting the resources of an operation, which they themselves, it might have been anticipated, would have been the first to have exhausted. The common English fire-place—all cheerful, glowing, and comfortable as it looks—has many disadvantages. In the first place, it is terribly wasteful, and burns away coal with the greatest disregard of economy. Of this we won't say any more, because Geologists tell us there is coal enough in England and Wales to last at least two thousand years at the present rate of consumption; and unselfish as we are, within any moderately assignable bounds, we don't care nor profess to care how people are to warm their toes, cook their steaks, boil their tea-kettles, or smelt their tin, two thousand years hence. In the second place, our fire-places, in their strong endeavours to promote ventilation, pull large volumes of cold air most uncomfortably against our backs, or, rather, feet; whereas, inasmuch as people don't breathe by their toes, but by their mouths and noses, our fire-places do not offer a fair amount of ventilative retribution for the chilling of our feet and backs. Some of these disadvantages have been provided against by a foreigner, M. Noirsain, who has come forward to minister to our national ventilative crotchet. We observe stoves, in shape something like cabinet pianos, and so constructed, that by opening little trap-doors here and there, the ventilative agency may be diffused.

Most persons have noticed the different properties of various kinds of heat on the human frame. Who has not wandered occasionally into those lower regions of metropolitan houses sacred to the culinary mysteries of the cook? Who has not seen, when thus wandering, the kitchen stove, all red hot and glowing bright as the fire which it contains, and ready to burst into flame itself, if only the atmosphere could be induced to feed it with a little more oxygen? Who, under these circumstances, has not felt a painful contraction of the skin of the head, a dizziness, a general feeling of suffocative oppression? The fact is, that heat, distributed from glowing hot surfaces, is most painful and unsalutary. No mere mixing, no tempering down of air which has once been heated very hot, can ever make it agreeable to the lungs. It may have been the fortune or fate of some who read this sketch, to wander into the Long Room of the London Board of Customs: we do not know whether the stove that stood there ten years ago exists at this day; we speak of the past when being understood to say that the warming apparatus called the Long Room stove would have afforded a fitting companionship to the brazen bull presented by an ingenious Roman artizan to the gentle Caligula, and into which victims being put, and fire applied, the machine emitted roarings like a veritable animal. The Customs stove would have gladdened the heart of a Torquemada for an instrument of slow torture; and its presence in the Customs department would hardly be defended by the most rancorous enemies of that celebrated branch of the fiscal service—no, not even by the Charlotte-row merchants committee of customs reform, or the manager of the London Docks, Now, the reason why the heat given off from the Customs stove was so oppressive in its character is simply this. Its construction was dictated by the false and unhealthy principle of heating very intensely a small volume of air, and of finally obtaining the proper breathing temperature by mixing the hot air with cold. This is essentially bad, unphilosophical, and incorrect. Did you ever burn a feather, or a bit of wool or silk, and notice the disagreeable odour resulting? A parallel effect to this is brought about by heating air to an inordinate temperature. The atmosphere is full of little animal and vegetable particles, which in a sunbeam may be seen floating about in countless myriads; and, besides this, the air contains animal and vegetable emanations, which, although invisible, are capable of being burnt, and of yielding the unpleasant empyreumatic odour we have described. Hence it follows, that ventilation being provided for, the next great desideratum to be aimed at is a large heating surface, so that the atmospheric emanations may not be torrefied as we find to be accomplished by the Custom-house stove.

The plan of ventilation proposed and carried out by Dr. Reid is merely an extension of the principles of an open English fire-place. This gentleman, by lighting large fires in certain allotted places of the buildings he desires to vetilate, establishes a draught from various directions, and thus accomplishes his ventilation. It will be easily recognised, that Dr. Reid's principle of ventilation requires every part of a building to be hermetically inclosed, except to the orifices of his ventilating tubes; and hence it is, that when his principle has been adopted, the nailing down of the windows has been imposed as a matter of necessity. Somehow or other, a long and noisy string of complaints have arisen against the Doctor's ventilating schemes; and now the proposed plan of Mr. Goldsworthy Gurney begins to be in the ascendant. This gentleman takes advantage of the property which high-pressure steam has, when blown into an orifice, of carrying before it large volumes of atmospheric air. In this way he not only proposes to ventilate the largest buildings, but also to maintain a constant purity of atmosphere in our largest, most complex, and most dangerous coal-mines. By the way, this very ventilating steam jet of Mr. Gurney is now largely employed as a means of injecting atmospheric air into furnaces. In this way we have seen it used in a silver cupelling furnace; and this fact crossing our brain, reminds us that we are in some measure pledged to a chemical account of the metal silver, which, accordingly, we will describe as soon as we have discussed a subject still more immediately suggested by radiation, namely, the subject of heat.

It is strange enough, that heat, although constantly affecting our sensations, is enveloped, so far as its intimate nature is concerned, in the most impenetrable mystery. With a show of making things plain, philosophers have made a distinction between heat considered as an abstract principle, and the sensation to which it gives rise; the former, whatever its nature, they term caloric, and the latter simply heat. Others, again, have adopted the plan of describing heat under the two names of latent or hidden, and sensible or evident heat; but this distinction does not make the matter much clearer. Our means of measuring heat are indeed meagre and imperfect: as to our sensations, they are fallacious in the extreme, and the thermometer affords us a range of indications much more narrow in extent than people are apt at first to think. The principle of the thermometer is simply this. Bodies expand, as is well known, by being heated, as many a thrifty housewife has before now discovered, when unable to put in its place the red hot iron of her Italian heater, although it fitted perfectly well when cold. Such being an effect of heat, then, it is quite easy to conceive, that if mercury or spirit be put into a bulb communicating with a very narrow tube, the liquid on expanding by heat must rise, and on contracting by cold must fall. This is the common principle of the thermometer—details we mean to discard, with the mere summary observation, that the markings on a thermometer stem are purely arbitrary, and may be great or small just as suits people's fancy, provided their exact conventional value be properly pointed out. We will not even tell the reader in this place how the mercury or spirit got into the glass bulb and tube, seeing that in the thermometer it is absolutely closed up on all sides; neither will we tell our curious inquirer why it is that water will not do for the thermometer-making liquid. All these answers must be sought in books of chemistry. One thing, however, connected with thermometers is of such practical importance that we may not slur it over. It is too common for people to choose thermometers—not as the Vicar of Wakefield chose his wife, and as she chose her wedding gown—because they promised to wear well—but because of an elegant-looking exterior with which thermometers are oftened accompanied. Now, people who indulge in these pet thermometers cannot be too firmly impressed with this fact, that once a thermometer tube becomes broken, there is an end of the whole apparatus; the scale was made for a specific tube, and will do for no other. This philosophy, depend upon it, is correct, although, should you happen to have a broken thermometer, and send it to be mended to some of those elegant-looking shops, in the regions of Saffron-hill, the philosophy we have inculcated will not be taught you there. Whether it is from politeness and desire to oblige, we cannot tell; but this much is certain, that many thermometer makers will favour a customer by adding a second tube to an old scale. We don't mean to say that any of the exhibitors would do such a thing; present company, of course, is always excepted from obnoxious strictures.

But to return to the thermometer, of which we were saying that the amount of instruction conveyed by it to us was really very small. First of all, it gives no indication of that kind of heat which cannot be felt; of which proposition we can cite a very easy proof. On some cold winter's day, when the atmospheric temperature has sunk considerably below the freezing point, which is 32—has sunk, we will assume, to the temperature of 28—let us suppose the bulb of a thermometer to have been frozen into a mass of ice. If then the thermometer be a good one (not such an instrument as we have described as made with a new tube and an old scale), the degree indicated will be, as we have said, 28. Matters being in this state, if the mass of ice, with its imbedded thermometer bulb, be put into a saucepan and heated over the fire, the thermometric liquid will gradually rise. Nothing so extraordinary this, it will be rejoined; it ought to rise, because the ice must necessarily be getting hot. Very well; but presently the degree reached is 32, the degree at which water freezes, when, curiously enough, there the thermometer stands; in vain we urge the fire, in vain the saucepan acquires more and more heat, there stands the thermometer at 32, and there *it continues to stand* until every particle of the ice has become melted, when, tired of its obstinacy, it begins to rise again. Now, from this experiment it is quite clear that the thermometer is incapable of indicating, much less measuring, the heat which enters into melting ice. This is one of many cases which might be cited to prove that the thermometer is totally incompetent to measure latent or hidden heat. Indeed, its measurement of evident heat is not a measurement of quantity, but of intensity, as we can easily make appear. Thus, a quart of boiling water must necessarily contain more heat than a pint, notwithstanding that the thermometer indicates the same degree for both.

Having thus shown up some of the imperfections of the thermometer or heat measurer, as it calls itself—we will very quickly dispose of heat, seeing that we do not mean to go into the recondite philosophy of latent heat, but intend confining our remarks to the phenomena of heat as commonly understood. There are three methods by which heat distributes itself, and these we shall now proceed to make appear. They are termed *conduction*, *convection*, and *radiation*; and may be thus explained. If we take a poker, and thrust it into the fire, it needs no philosopher to say that the end in contact with the fire will become very hot. If the poker be allowed to remain for a certain time, the other end or handle will also become hot, thus proving that heat has been really *conducted* from one end of the poker to the other; and if by chance a copper bar had been substituted for the iron poker, the conduction would have been more rapid still. Thus we have an illustration of the first of the three methods by which heat distributes itself. We learn also, that copper is a better conductor of heat than iron; and were we to employ bars of various other metals, it is evident a comparative scale of conducting power could be easily determined and laid down. The second means of heat distribution, viz. convection, depends upon the property possessed by heat of causing bodies to expand, and, therefore, to become specifically lighter than those around them. Convection is a means of heat distribution that can only take place in liquids or gases, as will presently be made to appear. Let us take atmospheric air as an example: not only will it afford us a good illustration of the process of convection abstractedly considered, but it will show us the reason of draughts in chimneys, of the ascent of fire-balloons, and will explain the nature of trade-winds; so intimately are the phenomena of physical science combined with each other.

The starting point for the illustration of all this philosophy may be variously chosen. For our part, preferring simple experiments to those which are abstruse, we shall desire our readers to summon imagination to their aid, and fancy themselves little boys and girls, wiling away a few stray minutes in the blowing of soap bubbles. Some burst at once, and of them we can learn nothing; others mount up into the air, when, gradually collapsing into smaller dimensions, they come down again. Why did they go up? why did they come down? The answer to these questions will plainly lay open to us the whole philosophy of draughts in chimneys, of fire-balloons, and of winds. In the first place, it is quite clear that the bubbles did not ascend on account of a gas of specific lightness they might have contained. The breath, as it comes from the lungs, is largely charged with carbonic acid—a gas so much heavier than air, that it may be poured like a liquid from one vessel to another; but this carbonic acid coming from the lungs hot, is expanded into proportions of such increased size, that it becomes for the time lighter than the atmosphere, and therefore the soap-bubbles containing it ascend, until cooling by their flight the natural weight of the gas comes into operation, and brings them down again. Now, whether this gas had been contained in soap-bubbles or not, it would, on being heated, have ascended just the same, carrying with it the heat by which its expansive and ascending power was acquired: for this reason, hot air rises in chimneys, and cold air rushes to take its place, giving rise to what is termed in ordinary language a draught.

Winds are nothing more than gigantic draughts; and of all winds, the trade wind, being most constant in its action, is the best we can fix upon for an illustration. Inasmuch as the tropical regions are hotter than the temperate and polar regions, so it follows that from the ground plane of the former an ascending current must continually arise; thus soliciting two enormous draughts—one setting in from the north pole towards the equator, the other from the south pole to the same; and thus, were the earth stationary instead of rotating on its axis, the two grand currents of the trade winds would be due south and due north respectively; but the earth rotates from west to east, and consequently it follows that the trade winds blow in the direction of north-west and south-west respectively.

After our experiment of soap bubbles, it will be scarcely necessary to enter upon the philosophy of fire, or Mongolfier balloons, which derive the latter appellation from the name of the inventor M. Mongolfier. Instead of being little soap bubbles closed in all directions, fire-balloons are supplied with an open neck, under which is burned some material best adapted for the intended purpose. In the present day fire balloons are mere toys, but originally they were made sufficiently large to take up aëronauts. When first employed, the rationale of their ascending power was so ill understood, that *smoke* and *hot air* was imagined to be the ascensive principle; accordingly, a favourite fuel was a mixture of wood and chopped straw.

So much, then, for the property of convection as applied to gases; that it also applies to liquids, needs scarcely to be pointed out, such being a matter of the most self-evident necessity. We may, therefore, at once say a few words about radiation, and bid adieu to heat. If the glowing hot poker be taken from the fire, and the hand or a thermometer be held below it, a manifestation of heat downwards will be evinced. This sort of heat distribution clearly cannot be dependent on either of the two agencies already described; not by conduction, because there is no solid to conduct it; not by convection, because convection would have acted upwards: there is another means of heat distribution called *radiation*, from the word *radius*, a ray. In this way, light and heat present some remarkable analogies; and in this way we receive our heat from the sun.

Thus ends all that we shall say, at least now, about heat.

COAT OF MAIL. BY WILKINSON AND SON.

The coat of mail, of steel chain armour, exhibited by Messrs. Wilkinson and Son, is interesting as showing what can be done in this way at present.

COAT OF MAIL.—BY WILKINSON AND SON.

ARMS AND ARMOUR.

(SECOND NOTICE.)

WE now come to describe the Projectile Weapons in the Great Exhibition; and our first remarks shall be directed towards the various bows which are there found.

Most nations, civilised or savage, have, at one period or another of their history, used the bow; and we, amongst all toxopholites, have, perhaps, been the most justly celebrated. In the Great Exhibition are to be seen many bows of different kinds. We will pass them under review:—

In the Indian department the visitor will see many specimens of bows—some rude enough, and long, the caricature of the shape now used by modern toxopholites; others short, curved, and highly ornamented. The first merit no description; but the second kind should be pointed out as the true Scythian bow, the instrument which has been employed from time immemorial by all the Asiatic tribes from Persia to the West. Its construction is peculiar: the foundation of the instrument is wood; but it is not from the wood that the bow derives its elasticity. This is given by animal tendons laid on the wood wet, bound tightly down, and allowed to dry. This kind of bow is very short, as the observer will see; but the accompanying arrows are taper and long. In fact, the Scythian bow, though short in appearance, yet derives from its double curve a large expansive and contractile play.

Returning to the history of the bow, it is unnecessary to inform the reader that it is mentioned in Scripture, even at so remote a period as is represented in the book of Genesis, where it is said of Ishmael, that the "Lord was with the lad, and he grew and dwelt in the wilderness and became an archer." The overthrow of Saul, it will be remembered, was particularly owing to the Philistine archers; and David commanded that the children of Judah should be taught the use of the bow.

The Greeks had a tradition that the bow was invented by Apollo, who communicated the use of it to the inhabitants of Crete: hence, in later times, the Cretan archers were thought superior to all others. According to some authorities among the Greeks, Perses, the son of Perseus, had the credit of discovering the use of the bow; others attributed this honour to Scythes, the son of Jupiter. All these traditions demonstrate the antiquity of the bow.

The Grecian bows were usually made of wood, but still commonly enough of horn—or rather two horns joined together by a middle piece, which served as a handle. The latter form of bow presented a beautiful combination of curve and straight line, which a highly artistic people preferred to transmit to posterity in their sculpture. It is the real classic bow—the instrument with which Cupid is always painted, but which becomes a very troublesome instrument to make out of any other element than horn.

There were various methods of using the bow. The ancient Persians drew the string towards the ear, as was always the practice of the English, and as is employed by British toxopholites at the present day. The Greeks, however, drew the bowstring towards the breast—and represented the Amazons as doing the same. The tradition of the Amazons cutting off the right breast, in order to give greater freedom in drawing the bowstring, is familiar to all.

With the Romans the bow was never a favourite weapon. Their daring soldiers always preferred the hand-to-hand pilum and doubly-cutting sword. The pilum, strictly speaking, was a projectile weapon, but, as its range was only a few yards, it scarcely merits our notice as such. The pilum was a short and heavy spear; of which weapon every man of the legionary soldiers carried two, which he hurled against the enemy previously to the sword attack. The point of this weapon was very long and small, and hence became so bent on striking an object as to be useless afterwards. This was not an imperfection, but the reverse; since, otherwise, the enemy might, if uninjured, hurl back the javelin with good execution to the quarter whence it came. This information we derive from Polybius; who also informs us that during the Cimbrian war the pilum was considerably improved by Marius, who so fashioned it, that, on striking the enemy's shield, it bent down at an angle in the place where the iron joined the wood, thus becoming totally useless to the party who received it.

Until the period of the second Punic war, the Roman armies were devoid of archers, save those who came with the auxiliary troops: and, though subsequently to the period in question bows and arrows were more employed by this people, yet, so far as we can learn, their use was limited to Orientals in Roman pay. Up to the period of the death of Clovis, A.D. 514, the French did not employ the bow in their military service; but there is abundant testimony to prove that its use was general in France in the reign of Charlemagne, who flourished in the beginning of the eighth century.

The fame of the bow as an old English military weapon is proverbial, though its antiquity in this capacity is not so great as many are disposed to believe. For the purposes of amusement or the chase, the bow was undoubtedly employed both by Anglo-Saxons and Danes, having been derived most probably from Scandinavia; but the military employment of the bow in England dates from the conquest by the Normans. Harold, it is well known, was shot by a Norman arrow; but no mention is made of archers on the side of the Saxons. The Saxon bow, indeed, as we have it represented in a MS. of the tenth century, must have been altogether unadapted for military purposes. Its size was that of a mere toy, and the string, instead of being attached to each end, was allowed to play from two points some considerable distance towards the middle.

Although we know that the battle of Hastings was mainly determined by the Norman archers, we are not informed whether the bows employed were cross-bows—such as are at present used for shooting rooks, being mounted on a stock like a gun, and bent and discharged by mechanical means—or long bows. Grose, the antiquarian, who afforded such a theme of innocent raillery to Burns, argued the long bow to have been the Norman weapon; others, and, we think, with much greater show of probability, imagine testimony to be in favour of the cross-bow—an instrument which was subsequently employed by France and Continental nations in preference to the long bow, which latter became eventually the national weapon of the English.

About the year 1139 the military employment of the long bow was much extended, in consequence of the arbalest, or cross-bow, being put under a ban by the second Lateran Council as an instrument hateful to

God and unfit to be used amongst Christians. Pope Innocent III. confirmed the prohibition, which was observed under the reign of Louis the Young and of Philip Auguste, but immediately afterwards discontinued both in England and France. Subsequently, Richard I. introduced the cross-bow into our armies, and his death, as all know, was caused by an arrow or bolt discharged from one of these weapons, during the siege of Chaluz, in Normandy—a judgment, as was said, for his temerity.

About the time of Edward II. the use of the long bow in the English armies was greatly extended, although the cross-bow continued still to be employed. About this period, we find the cross-bowman precisely indicated by the word "balistrarius," "sagittarius" being the appellation of the long-bowman. In the reign of Edward III., the long bow may be said to have become the national weapon of the English. This Monarch took great pains to increase its efficacy, and at the battle of Cressy the superiority of the long bow over the cross-bow was well shown. The battle was ushered in by a shower of rain, from the effects of which the bow-strings of the Genoese cross-bowmen in the service of France were so relaxed that the weapons were almost useless; whereas the English long bows, having just emerged from their cases, played with terrible effect. Now the very shape of the cross-bow would prevent its being put into a case; and, moreover, soldiers armed with this weapon could never stand closely together.

Ten years afterwards occurred the battle of Poictiers, in which the part taken by our archers is well known. The sanguinary victory of Homeldon against the Scots was entirely won by English archers, who again did terrible execution at the battle of Shrewsbury, where Hotspur was slain; and at Agincourt scarce a lance was couched or sword drawn.

It was no wonder, then, that the long bow became the favourite English weapon, specially cherished and protected by every British Sovereign from Edward II. to Charles I. Henry VII. altogether prohibited the use of the cross-bow; and Henry VIII. renewed the prohibition; indeed, he went further, and passed a statute by which a fine of £10 was inflicted on any person who should have a cross-bow or handgun discovered in his house!

Although the long bow was held in much estimation by the bluff Monarch, yet firearms had by this time arrived at considerable perfection. Even much later, during the reign of Elizabeth, the bow was considered by many a superior weapon to the musket.

Unquestionably the longest arrow flight on record is mentioned in a story told by Fidousi, the Persian Homer, and repeated by many historians of good repute. We will add to these number of narrators, without at all pledging ourself as to the truth of Fidousi's story. In ancient times (so goes the tale), when Mensocheher, the grandson of Feridoon, made peace with Afrasial, the Scythian invader, one of the articles of treaty was, that Persia should have all the country to the north-east over which an arrow could be shot from Demavend. A hero, named Arish, ascended to the top of the mountain, and shot an arrow to the banks of the Oxus, a distance of between five and six hundred miles! It stands to reason that so long a range must have required a perceptible time; accordingly, the poet informs us, the arrow which was discharged at sunrise did not fall until noon! Now, so extraordinary a shot would seem to relate to long bow practice, but the long bow was not known to the Persians.

The English archers, celebrated as they were in the use of the bow, never accomplished anything approaching to the Persian feat; their utmost range was scarcely more than 500 or 600 yards, and our degenerate modern Toxophilites can only achieve 400 or 500 yards. The Turkish ambassador, when in England in 1795, sent an arrow upwards of 480 yards, in the presence of several members of the Toxopholite Society. His bow was made of horn, and is still in their possession. This was considered at the time a very long shot, yet two or three have occurred since archery has been a pastime which have exceeded it by twenty or thirty yards. There is a tradition that an Attorney of Wigan, in Lancashire, shot a mile in three flights; and a Parliamentary enactment during the reign of Henry VIII. imposes a penalty on any person who, being above the age of twenty-four, shoots at any mark at a less distance than eleven score yards.

And now, before totally discarding the bow, and proceeding to the description of guns individually, it may be interesting to examine for testimony concerning the power of the weapon of our early archers. In their hands the bow was, indeed, no toy, but a weapon of terrific effect, as we have abundant testimony to prove. One of the most interesting cases of the power of the long-bow that we know of is recorded in the works of one William Clowes, a surgeon in the reign of Elizabeth, who relates, as a professional case in his own practice, the difficulties he experienced in extracting the barb of an arrow from the leg-bone of one Master Withepole. It appears that this person went to enjoy an archery review of our good Queen Bess, and, to put himself beyond the range of accidents, he stood a long way from the target—how far away, we are not told. Notwithstanding his care, Master Withepole received a sheaf arrow in the bone of his leg, and it would appear that the soldier who shot him was at least 200 yards distant. A surgeon being on the field of review, the sufferer was committed to his charge, but without avail, for the arrow-head could not be extracted. Eventually, our surgeon author Clowes was called in, who was more fortunate. "I did put downe a probe," says he, "into ye bottome of ye wound, where manifestly I did feele ye head of ye arrowe, and I was driven to make a reasonable large incysion down unto ye bottom; whereupon I did put down a dilatorium, to open ye wounde, and so presently I did take hold of ye arrowe-head by a rostrum gruinum!" Unquestionably, doctors were the most deadly of all warlike engines in those days. Mr. Clowes no sooner extracts the arrow, than he writes many stanzas of poetry in glorification of his triumph, and designates the less fortunate surgeon "a treacherous runagate, counterfeit, land-loper, sophystycall mountebank, cozening quacksalver, and false jngling deceiver, whose bloudy hands, without knowledge, doe hazard the lives of many."

The instance we have given of the power of ancient archery bears the stamp of evident authenticity, and represents a sufficiently terrible effect. Other and more ancient examples, representing the bow in a still more formidable light, can easily be found. Thus, the old author, Giraldus Cambrensis, says, "that certain Welsh archers shot at the oak doors of a portal, behind which a party of soldiers had concealed themselves. These doors were no less than four inches in thickness; nevertheless, the arrows penetrated quite through." The same author also states, on the authority of William de Breusa, that, at a battle where the latter was present, a Welshman, having directed an arrow at a horse-soldier clad in armour with his leather coat underneath, the arrow pierced him through the hip, penetrated the saddle, and mortally wounded the horse. Another Welsh soldier performed a similar feat, with this addition: the man, feeling the wound, turned about, when immediately a second shaft penetrated the other hip, and fastened him to the saddle on that side also, in such a manner that he could not dismount!

The Cornish, as well as the Welsh, were also greatly celebrated for their skill in archery. Carew, speaking of the skill of Cornish archers two centuries back, says, "Their shaft was a cloth-yard in length, and their prickes twenty-four score paces (equal to 480 yards); and, for strength, they could pierce any ordinary armour; and one Robert Arundel, whom I well knew, could shoot twelve score aces with his right hand, with his left, and from behind his head."

Another anecdote of the skill of Cornish archers is related in Hall's "Life of Henry VIII." "There came to his Grace (the King) a certayn man with a bowe and arrowe, and he desired his Grace to take the muster of hym, and to see him shoote; for that tyme his Grace was contented; the man put hys one fote in his bosome and soe dyd shote, and shote a very good shote, and well towardes hys mark, whereof not only hys Grace but all others greatly merveyled: soe the Kynge gave him a rewarde, and for this curious feate he afterwardes obtained the bye-name of fote in bosom."

With regard to the comparative powers and length of range of the cross-bow and long bow, it might be assumed that the former, bent as it is by machinery, would excel; such, however, does not seem to be the case. According to an ancient author on projectile arms, the cross-bow would kill at a point blank range of forty to sixty yards, but, if elevated, much farther; still not so far as the long bow. On the whole, it would seem that the cross-bow was more certain of hitting a small mark than the long bow, but would neither project so far nor was it capable of being discharged with such rapidity. Cross-bows usually shot short darts termed quarrels, or *carreaux*, but occasionally bullets, which latter are now universally employed when modern arquebusiers have recourse to the cross-bow for the purpose of shooting rooks.

We will draw our rapid sketch of the history of the bow to a conclusion by stating that the last time cross-bows were used in our armies was in 1627, in the attack on the island of Ré. The long bow, however, remained in use much later. In 1643 a company of archers was raised for the service of Charles I., and the Marquis of Montrose employed archers against the Scots.

One great disadvantage under which both archers and cross-bow men laboured, was their want of means of defence against charges of cavalry. For the purpose of defending themselves under these circumstances they were supplied with sharp stakes, which they planted in the ground, and presented to the advancing troops, after the plan of the modern bayonet. Very late in the annals of military archery, during the reign of Charles I., one Neade developed the use of the bow and pike together; but, notwithstanding the traditionary affection with which the fletchers (or arrow-makers) and bowyers viewed military archery, the musket was now too far installed for the bow to maintain its standing. The reader must not imagine, however, that the muskets of the time of Charles I. were the effective instruments of our own time; on the contrary, they were heavy and unwieldy; troublesome to charge and discharge, slow to manœuvre, and still more defenceless than the bow against cavalry. When first introduced, those who used them seem to have carried their ammunition and borne their pieces just as pleased their own fancy. Some used cartridges, some flasks, and all were under the necessity of carrying two kinds of powder—one grained, for the charge; the other, *mealed*, called *touch* or *tutch* powder, for priming. An ancient author on fire-arms employs considerable argument to prove that a properly charged gun should have wadding interposed between the powder and ball; and he expressly informs soldiers that wadding should be lightly rammed down on the ball, to prevent its rolling out. In the reign of James and Charles I., an appendage called the bandelier was introduced, for the purpose of carrying the musqueteer's ammunition. It consisted of a belt, from which hung down various charges of powder and ball. Thus the soldier was spared some trouble in charging his piece, but was, at the same time, exposed to the danger of having his bandelier take fire.

The Spaniards, under Philip II., are said to have been the first to employ small fire-arms in the year 1555, at least, small fire-arms in our acceptation of the term. Instruments called hand cannons are said to have been introduced into the English army in 1471, when Edward IV., landing at Ravenspur, in Yorkshire, brought with him among other forces, 300 Flemings, armed with those weapons.

The greatest revolution which has taken place in the construction of portable fire-arms, concerns the lock or discharging apparatus. At first they were totally devoid of lock, and their discharge was effected by manual application of a match: then followed the match-lock; next the wheel or pyrites lock; then the ordinary flint lock; afterwards the various kind of percussion locks, which will more properly fall under our notice by and by. The match-lock scarcely merits description, and flint and percussion locks are, it is presumed, familiar to all. The wheel-lock, however, perhaps few have seen, and, therefore, a slight description of it may not be amiss. Whoever has observed the shower of sparks which fly off from a razor-grinder's apparatus will have a very fair idea of the construction of a wheel-lock. The wheel was made, however, of steel, and was caused to rub against a flint or lump of pyrites; it was, moreover, wound up by a key, so that, on pulling a trigger, it spun round with great velocity, emitted a shower of sparks, and thus ignited the charge. The pyrites or wheel-lock was introduced into England about the reign of Henry VIII., and continued in use until the reign of Charles II., when the flint-lock became general. The percussion-lock, as most people know, is a very recent discovery indeed.

We have no further space to devote to the history of the bow or ancient guns, and will now take leave of our readers, by directing their attention, not only to the English bows in the Exhibition, but also to some very pretty specimens of Swiss make, in the department of that little republic. Our next article will be devoted to the examination of special peculiarities of modern guns.

NASMYTH'S STEAM HAMMER.

Perhaps there is not on record an invention which has introduced itself into such extensive use in so short a time as Nasmyth's extraordinary steam hammer. One of these powerful engines, of the size most in use, is placed in the southern division of the Machinery department of the Great Exhibition, not far from the Britannia hydraulic press; and, indeed, it is much to be regretted that this most useful engine is not shown at work, neither is there any account of it in the official and illustrated Catalogue. Since 1842, in which year Mr. James Nasmyth took out his patent, not fewer than 380 of these powerful and manageable machines have been constructed and distributed in all quarters of the globe. In many of the large engineering establishments around London, we find even three and four called into requisition; and we advise those of our London readers who have an opportunity of visiting any of the respective establishments of Messrs. Maudslay and Field, Lambeth (who have three hammers of the respective weights of 30, 15, and 5 cwt., for different kinds of work); Penn and Son, Greenwich; Blyth and Co. and Seaward and Co., Limehouse, Miller and Ravenhill, Blackwall; and last, though most important of all, the highly interesting and extensive iron ship-building establishment of Messrs. J. C. Mare and Co., at the Orchard House, Blackwall, to lose no time in seeing the extraordinary operations performed through the instrumentality of the steam hammer, requiring for itself the attendance of one person only. The accompanying Engraving represents an elevation of the hammer, which for this, the most useful size, weighs only 30 cwt.; but the most gigantic machine of the kind which has yet been turned out is that at Messrs. Mare's large works, having a hammer of 6 tons weight, with a stroke of 6 feet. On a recent visit to this establishment, we found one of those ponderous and apparently unwieldy paddle-wheel shafts for a pair of marine engines, building by the celebrated firm of Maudslay and Field; this shaft, which had been entirely forged by the giant hammer "Thor," occupied upwards of three weeks from its commencement to its completion: it is of the extraordinary weight of 16½ tons, and 27 feet 9 inches in length; yet, by aid of a powerful crane, the operation of welding and forging this large mass is rendered as simple and easy as that of a horse-shoe in the hands of a country smith. Messrs. Mare and Co. have also three other Nasmyth hammers, each decreasing in power to suit various kinds of work. Referring to the hammer contributed to the World's Fair, we find the anvil, which is chiefly buried below the floor, weighs eight tons; the hammer itself, already mentioned, and which is suspended from the piston rod, 1½ ton: the piston which works in the cylinder, placed at top of the machine, is of 16 inches diameter; and the extreme fall of the hammer, or what in steam-engines is usually called the stroke, is equal to 42 inches. The ingress steam pipe is of two inches diameter, the pressure of steam usually employed being equal to 40 lb. on the square inch, which, as we have in another communication stated, is about the same as that at which the steam enters the Machinery in Motion department of the Great Exhibition. The hammer being on the self-acting principle, every degree of blow, from that of merely cracking an egg-shell to that of a dead pressure of 500 tons, is attainable. The whole width of the frame at the level of the floor is 11 feet; and the space between the legs in which the top of the anvil is placed is 7 feet; the height of the machine being about 15 feet. The frame is bolted down to large iron plates let in flush with the floor; but if the hammer at the Exhibition had been intended to have been shown in operation, a much stronger foundation would have been required. By admitting the steam under the piston, the hammer is elevated to the desired height; and by its own gravity the hammer falls: but the fall may be instantly eased, if desirable, by the admission of steam, according to the particular kind of blow required. In ordinary work, as many as 70 blows are given in a minute.

In the former part of this notice we mentioned the large engineering establishments in and around the metropolis, at which the steam hammer may daily be seen fulfilling its appointed duties; but at all the principal anchor-makers, at all the large engine builders, and at the principal railway manufacturing establishments in the kingdom, the making up of iron, either from scraps, old rails, hoops, or from the pile, is also effected by means of the Nasmyth hammer.

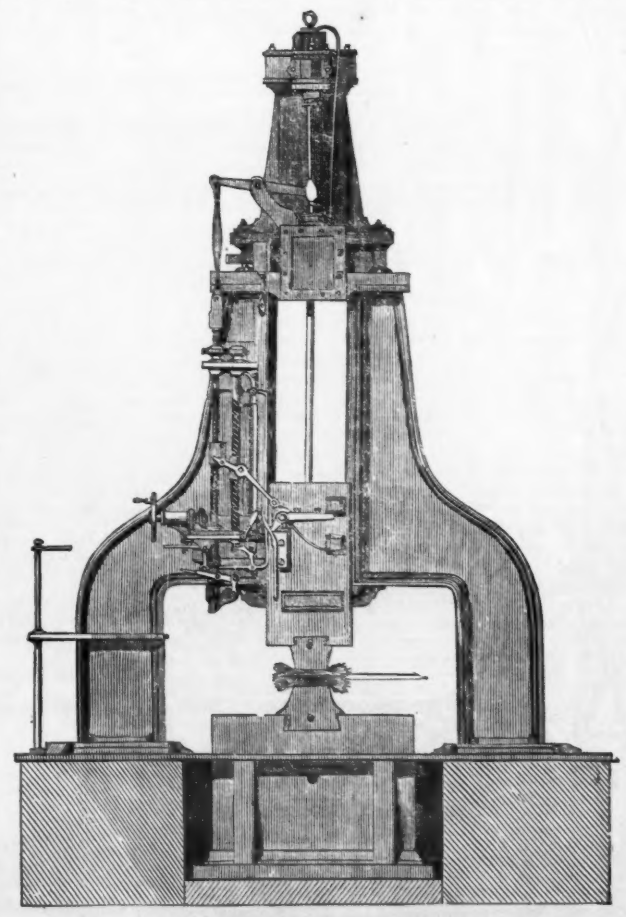
From a statement of iron made by the use of this machine at the North-Western Company's manufacturing establishment at Crewe, in six months ending June, 1851, we find that upwards of 176 tons of iron, in the shape of tires, axles, &c., including a shaft for a stationary engine, was made; and that, after deducting the cost of wages, scrap iron, and coals, there is a clear profit of upwards of £2300. Nothing can be more convincing of the utility of this engine than the above fact. Before the introduction of this adjunct to the smithy, the forging of the large marine engine shafts was not only a tedious but an uncertain process; and many an accident which has occurred to the ocean steamers might have been traced to the imperfect forging of the iron; for, without blows of sufficient energy, it is impossible to expel the scoria from between the bundles of iron rods, which, as in the United States, they attempted to weld together to form their main shafts.

Before concluding, we may draw the attention of our friends to those beautiful anchors forming part of the Great Industrial Show, which are seen by comparatively few of the visitors to the Great Exhibition—on account of being placed in the yard at the west end of the Building—all of which were wrought by the aid of the steam hammer, and which are severally contributed by Brown, Lennox, and Co.; the Bedlington Company, near North Shields; and Fox, Henderson, and Co., the constructors of the Palace of Glass, for Captain Rogers, who has designed a new form of anchor.

It is quite impossible to say to what uses Nasmyth's last invention will hereafter be applied. At the present time, however, in addition to the formidable kind of work for which it has hitherto chiefly been employed, its application to the stamping out of dish-covers, and the moulding and forming of silver plate, is now in progress.

It is curious enough, in looking over the specification of James Watt, to discover that he had thought of using a hammer in connexion with the power of steam, but had never worked out the really useful mode of applying the hammer, viz. that of attaching it to the piston-rod itself. This important step was left for the genius of one of our own times practically to carry out. It is in Watt's patent of April 28, 1784, that we find the following:—

My fifth new improvement consists in applying the power of steam or fire engines to the moving of heavy hammers, or stampers, for forging or stamping iron, copper, and other metals or matters, without the intervention of rotative motions or wheels, by fixing the hammer or stamper to be so worked either directly to the piston or piston-rod of the engine, or upon or to the working beam of the engine, or by fixing the hammer or stamper upon a secondary lever or helve, and connecting the said lever or helve, by means of a strap or of a strong rod, to or with the working beam of the engine, or to or with its piston or piston-rod.



NASMYTH'S STEAM HAMMER.

BARTON AND EAMES' LACE GASSING MACHINE.

Mr. Samuel Hall, of Basford, near Nottingham, whose name is favourably known on account of his condensing apparatus and other inventions, originally took out a patent for a machine for gassing lace; and in order to show the importance of this invention, it is only necessary to state that the cost of burning off the fibres from muslin and other delicate fabrics, some thirty-five years ago was at the rate of 6d. per square yard, whereas at the present time as much as 600 square yards of lace may be gased for the same sum.

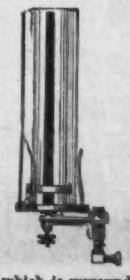
The gassing machine in the Machinery in Motion Department of the Great Exhibition, which is exhibited by Messrs. Barton and Eames, consists of a series of gas-burners, placed in a straight line, and regulated in length by the width of lace to be "gassed." The lace is made to pass through the various jets of gas at such a velocity as will just remove the fibres by which the whole surface is covered, and yet not destroy the fabric itself. It is quite evident, therefore, that the exact speed at which the lace is required to travel through the jets of gas must be regulated with great nicety; for if the velocity be too great, the object in view will not be attained.

During the process of gassing the lace is carefully watched by four persons, two of whom stand in front, and two behind the machine, in order to see that the lace is duly gassed, and also to prevent the fabric itself taking fire.

Cotton thread which has been subjected to a process somewhat similar to that above directed, by means of a machine somewhat modified from that in the Exhibition, is sold in the market as "gassed thread," and in consequence commands a higher price.

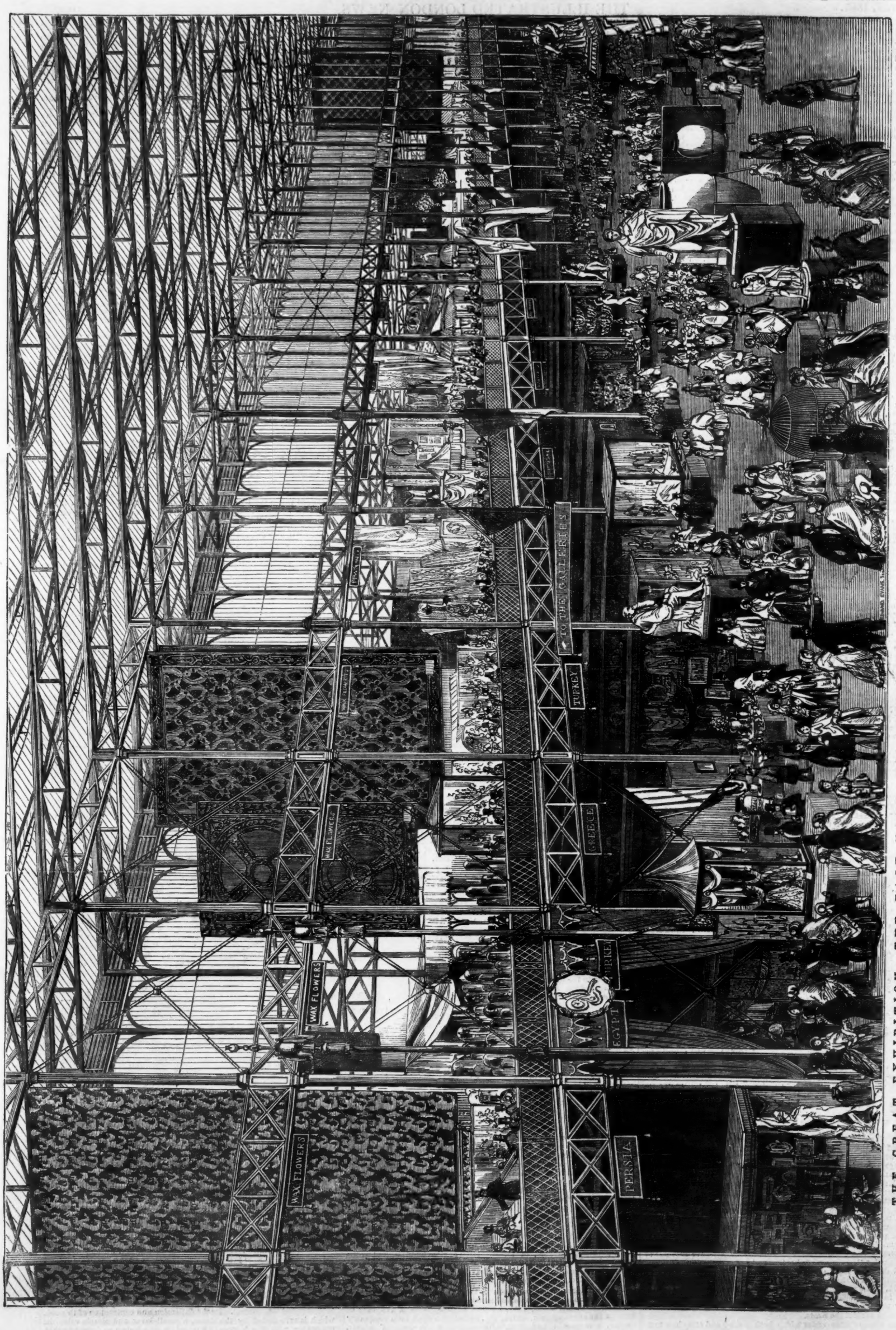
BIDDELL'S PATENT SELF-REGULATING GAS-BURNER.

The difficulty of maintaining a uniform flame in the ordinary gas-burner is well-known, not only to the manufacturer of burners, but also to the consumer of gas. To remedy so glaring a defect in artificial lighting, has long been a desideratum; and it was left for Mr. Biddell, of Ipswich, to accomplish so great and valuable an improvement; and the mode in which he has accomplished this is by the most philosophical means.

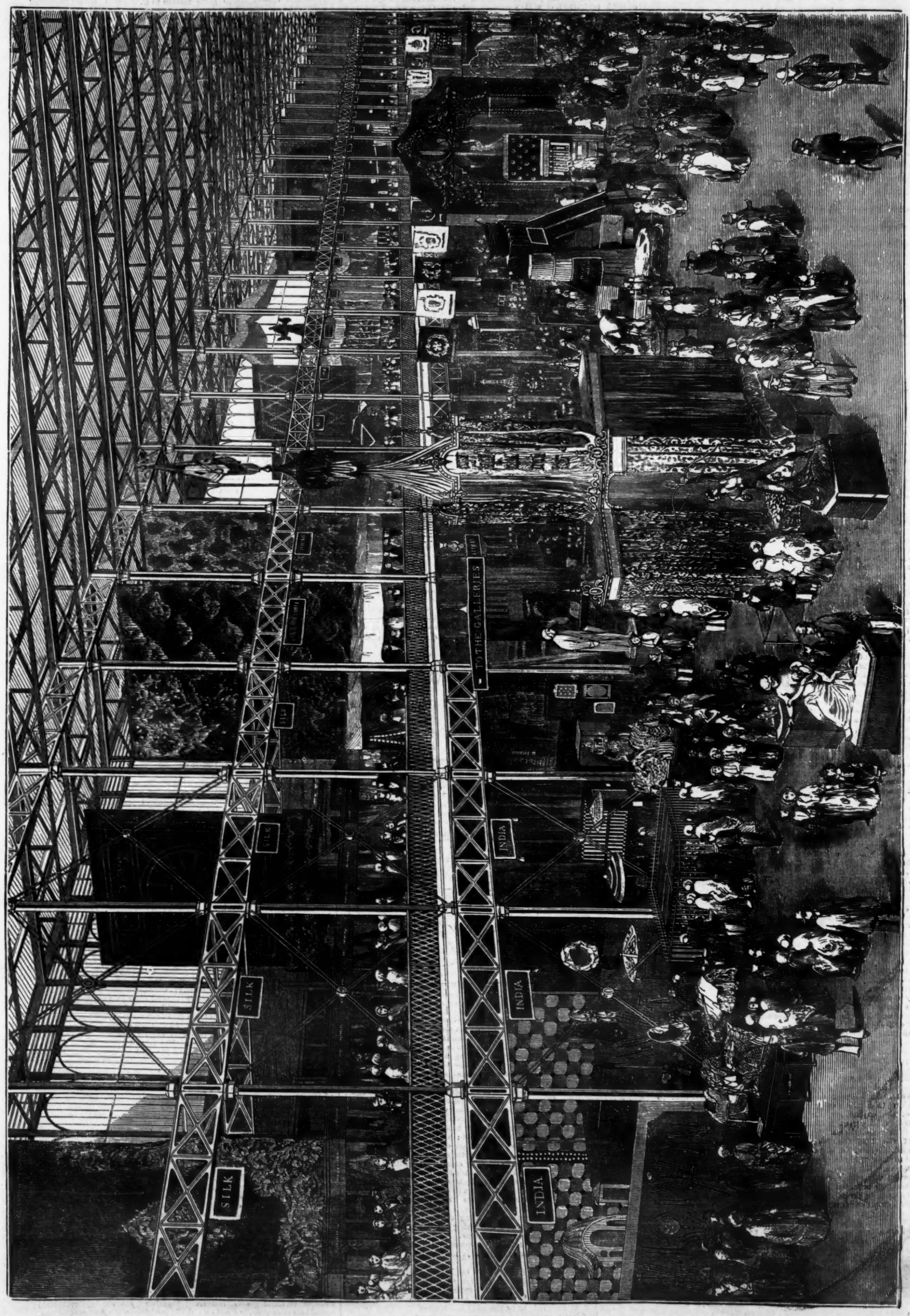


The inventor had in view, when he first proposed to remedy the defect already alluded to, the compensation pendulum of a clock, whose true length is preserved, notwithstanding the alternation of heat and cold to which it is continually subjected.

Thus Mr. Biddell introduces into the centre of the burner a vertical compound rod of about ¼ inch diameter, consisting of brass and steel, the cylindrical case being of brass, and the core within of steel. By the expansion and contraction of this rod, which is surrounded by the flame, a small lever and simple valve, in connexion with the bottom of the rod, is acted upon so delicately that the exact amount of gas required to preserve uniformity of flame is regularly preserved.



THE GREAT EXHIBITION.—THE EAST NAVE VIEWED FROM THE SOUTH-WESTERN GALLERY.—(FROM A DAGUERREOTYPE BY CLAUDET.)



THE GREAT EXHIBITION.—THE WEST NAVE VIEWED FROM THE NORTH-EASTERN GALLERY.—(FROM A DAGUERREOTYPE BY CLAUDET.)

MACHINERY IN MOTION.

(SECOND NOTICE.)

WE this week resume our description of Mr. Gwynne's centrifugal pump, from p. 250. There is a circular opening in one side of the case rather larger than that in the piston, through which the suction-pipe passes. The inner end of this suction-pipe is furnished with a collar, by which it is secured to a corresponding projection in the side of the piston. It is requisite that this joint should be made quite tight, to prevent the admission of sand, grit, &c. The discharge-pipe (in the present instance placed vertically) is fixed on one side of the receiver. A hollow balancing-nut is fixed in an opening on the opposite side to that in which the suction-pipe is fixed, the object of which is to equalize the lateral pressure on the piston. The main journal of the shaft is attached to the hollow balancing-nut, passing through a proper stuffing-box and gland, to render the whole properly water-tight.

In cases of fire, a pump on Mr. Gwynne's plan, with a discharge-pipe of 9 inches diameter, will throw 4000 gallons per minute; and for raising water from mines with a piston of 48 inches diameter (the pump making 400 revolvtions per minute), the water would be raised to a height of 120 feet.

The proprietor invites practical men to apply any reasonable test to his direct-acting balanced centrifugal pump, so that they may be enabled to make a comparison with other machines intended for the same purpose.

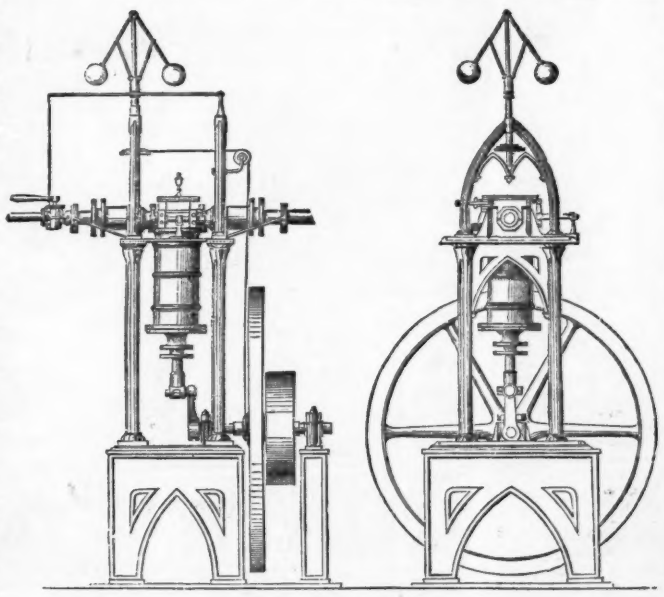
The general arrangement of Edwards' direct-acting engine (No. 12) is not very dissimilar to that of several other engines exhibited in motion. The fly-wheel and pulley are, as usual, on the crank shaft. From the pulley the motion, by means of a leathern band, is communicated to a second pulley, and so to the various American machines already mentioned.

We now come to the novel and ingenious engine of Messrs. Simpson and Shipton, which is worthy of especial attention. It is called by the inventors and proprietors, a "Patent Short-stroke Reciprocating Engine." The great object has been to unite, in as simple a form as possible, the advantages of the reciprocating and rotary engine, and thus obtain that kind of power which is equally applicable to engines required either for stationary, locomotive, or marine purposes. Thus, in the present instance, the piston and crank are combined, the piston being moved from top to bottom and from bottom to top of the steam-chamber alternately, as in the cylinder engines, while the crank still possesses all the properties of that in ordinary use. The principle of this engine is that of "an eccentric revolving in its own diameter." It has to overcome centres, as in the ordinary engine; the revolving motion, however, is obtained direct, instead of through the intervention of a crank. The steam-chamber is substituted for the ordinary cylinder. The eccentric, or piston, being keyed on to the shaft, a back plate is fitted into a recess in the steam-chamber, and is pressed against the piston, either by springs or by the admission of steam behind it. Thus, if any wear takes place in the periphery of the piston, the plate is intended to compensate for it. The piston is made steam-tight at both ends with rings of metal fitted with conical seatings cut open on one side so as to leave a lap-joint. The shaft is carried on vibrating rods, so as to vibrate the distance of the eccentricity of the piston. The power from the piston to the lower cranks is conveyed by means of connecting rods, which are always parallel, working in direct lines. Although the steam is admitted above and below the piston, as in ordinary engines, the valve is different, as it exhausts through the back, and is packed similarly to the ends of the piston, being worked by an eccentric lever. By the arrangement of this engine, the first motion may be attached direct to the main shaft; thus unnecessary gearing is dispensed with. The small space occupied by Messrs. Shipton and Simpson's engine, and the comparatively inexpensive foundation required for it, are among some of the numerous advantages which this singularly ingenious machine possesses. It is calculated at ten-horse power, and actuates all the cotton machinery of Messrs. Parr, Curtis, and Madely, of Manchester, including three self-acting mules, two roving frames, and three drawing frames. It also gives motion to two roving frames, and one power loom, of Messrs. Mason and Collier, of Roehdale.

The cotton machinery and long-line flax machinery of Messrs. Higgins and Sons, of Salford, including a patent roving frame and double self-acting mule, and also their flax machinery, including a drawing-frame, a roving-frame, and a spinning-frame; are all driven by the new rotary engine of Messrs. F. and G. Davies, of Tipton. These engines, which they call "patent elliptic revolving engines," are calculated at six horse-power; and, although at first putting us in mind of the Birmingham disc engine, invented by a person of the same name, yet, upon examination, are found to be entirely different in action, as the disc is the present instance rotates only in one plane, whereas in the disc engine the disc rotates between two cones.

All the machinery which we have already mentioned occupying the western court of the Machinery in Motion department, is driven by the engines of Messrs. Hick, Mr. Edwards, Simpson and Shipton, and Messrs. Davies.

We now enter the large hall of the Machinery in Motion, which lies between the second-class Refreshment-Room and the north wall of the Building; and the first steam-engine we meet with is that of Mr. Joyce, of Greenwich, which he calls a "high-pressure pendulous engine." The cylinder is suspended by trunnions from the top, and the piston gives motion to a crank, on the shaft of which are the fly-wheel and pulley. By a band from the latter motion is distributed to various pulleys and shafts, by which a variety of different machines are set and kept in motion. The engine itself is of simple construction, and does its work well; but the frame, of cast iron, is far too light, and consequently very shaky when all the machinery in connexion with it is in motion. The principle discovered by Woolf, of introducing steam of a high pressure into a small cylinder, and afterwards allowing it to act expansively in a larger one, adding to its effective force by condensation, is in this engine applied in an extremely ingenious and simple manner. The cylinders are not placed before each other, as is generally done in the beam engine, but firmly bedded and jointed side by side, forming what might be termed a double cylinder, which cylinders the inventors, upon a principle entirely new in this country, invert from their usual position, and suspend them between the framing, the trunnion pipes or steam ways being placed at the end, or what in the ordinary engine would be termed the bottom of the cylinders. By these means a direct motion is applied to the crank without the intervention of cross-heads, side-rods, or parallel motion; the piston-rod being attached to the crank pin, the cylinders vibrating with a pendulous movement on their bearings or trunnions, whilst the oscillation of the cylinders works the slides by means of a bar. These engines are capable of exerting a power of 50 per cent. more than the power at which they are rated. From the simplicity of the engine, there is no risk of derangement; and the friction of the working parts is diminished three-fourths, whilst the consumption of fuel is less than 3 lb. per horse power per hour, and there is a saving of one half the space usually occupied by the ordinary steam-engines. Messrs. W. Joyce and Co. first commenced manufacturing these engines in 1834; since which period they have been erected in large numbers. The accompanying cuts represent a front and side elevation respectively of the engine.



JOYCE'S STEAM-ENGINE.

The first machine actuated by Joyce's engine is for working spindles intended to supersede bands or straps, invented by Leopold Muller. It consists chiefly of a horizontal shaft, having a series of vertical bevelled cog-wheels working into smaller horizontal wheels attached to the spindles.

Master's ice-making machine, which has now been in successful operation for many years, and by which are rapidly made ices for the second-class refreshment-room of the Great Exhibition, is the next we find at work in connexion with Joyce's engine.

The third in order is Milligan's patented power loom, made by Hodgson and Haley, by which any number of picks may be put into a given length of work—its taking-up motion constituting the chief point of excellence.

The fourth is R. Sutcliff's patent spinning frame of 12 spindles which make 5864 revolutions per minute. This machine is exhibited on account of its high velocity, and for the regularity in the tension or drag.

The fifth machine driven by Joyce's engine is the new power loom of O. Chalmers, for weaving table-cloths. We observed in the loom a damask table-cloth of a rich pattern, extending when completed to 2½ yards square.

The sixth is George P. Macinder's self-acting mule of 84 spindles, for spinning cotton-wool into yarn, with oscillating lever for taking in or putting up the carriage, as also a mode of putting down the faller from any of the twist pulleys by centrifugal disengaging catches.

The seventh is the patent worsted winding machine of 12 spindles, of T. Lucas Paterson; woollen, cotton, or linen yarn, from the hank are also wound upon the shuttle *cop* or *pern*. It is exhibited on account of the saving of waste effected, and also as producing an "improved build of cop."

The eighth is a fine worsted damask loom, made by James Bairstow, and exhibited by Messrs. Taylor and Sons; the articles woven being all of English wove.

The ninth is Mark Smith's canvas loom, as also his fustian loom (Class 6, No. 22), three-shuttle gingham looms, and a small silk loom.

The tenth is Joseph Harrison's patent power-loom.

The eleventh, Hornby and Kenworthy's patent sizing or dressing machine; also two improved power-looms, exhibited by Kenworthy, and Kenworthy and Bullough, respectively—which have not only been described, but also illustrated in our pages.

Twelfth, and finally, an old power-loom, very curious on account of its being made and in general use more than half a century ago. It is exhibited for the purpose of illustrating the vast improvements which have been effected in the power-loom during the last 50 years.

McNaught's double-cylinder condensing engine, having 9-inch cylinders and 8-inch stroke, is shown in action in connexion with a machine for cutting out wooden bobbins, thirty of which are completed in each minute.

No. 24, Class 5.—Messrs. Lynch and Inglis, of Manchester, exhibit a one-horse portable engine of their own design, which works their wool-combing machinery: the cylinder is of 3½ inches diameter, with a stroke of 7 inches.

Among the numerous articles which have been admitted to the Building since the 1st of May, is a patent portable steam-pump, of W. E. Carrett, of Leeds, which is designed for lifting and forcing water in one continuous stream, at all pressures. It has a 4-inch cylinder and 7-inch stroke, and is worthy of an inspection on account of its novelty.

Messrs. W. Fairbairn and Sons supply power to the following machines by means of their vertical direct-acting steam-engine, having a 19-inch stroke, the cylinder being chiefly inclosed within the iron pedestal, as in the case of Mr. Hick's engine. Whether for its design, simplicity, or ease of action, it may be taken as one of the best samples of steam-engines sent to the Exhibition. The machines alluded to are the worsted machinery of Messrs. B. Berry and Sons, of Bowley, near Bradford, including altogether six frames; the woollen machinery of Mr. John Mason, of Rochdale, including a self-acting mule, and a patent condenser, or endless carding engine; as also a large power-loom.

Mr. Andrew Shanks exhibits in action his improved high-pressure engine, which actuates his screw-bolting machine, and also his detail planing machine.

No 29, Class 5.—Messrs Hodge and Co. exhibit an oscillating direct-acting engine. The cylinder, hung in the middle, is of 6 inches diameter, with a 20-inch stroke. This engine drives the flax-dressing machinery of Mr. Plummer, of Newcastle (No. 74, Class 6); the patent power-loom (No. 56, Class 6) for weaving sail and other cloths, the novelty of which consists in the introduction of a stick to beat up the weft; and the brick-making machinery of Messrs. Randell and Saunders, of Bath, which has generally been seen in action day by day since the opening of the Exhibition, until within a few days, when it ceased to work, on account, we were informed, of the expenses attendant thereon. Surely a portion of the large funds at the disposal of the Commissioners might be appropriated towards keeping in action the machinery of those exhibitors who do not find it convenient to continue the daily expense. Messrs. Randall and Co.'s machine is constructed for the purpose of making rapidly bricks for various purposes, according to their patent form, as well as every description of tiles and piping. The clay being properly pugged, by means of two screws working together, is made to pass through a die at one end of a cylinder, through which it is forced by considerable pressure. The bricks thus formed are found to be of uniform texture and size, as the continuous band of clay is accurately cut into the required length by a continuous cutter. With one-horse power, added to the labour of two men and a boy, not fewer than one thousand bricks are made by this machine in one hour.

The manufacturing tools of Mr. Whitworth are kept in motion by one of Penn's patent trunk engines, having a hollow piston working vertically (cylinder 8 inches diameter, stroke 9 inches), communicating motion in the usual way by means of a crank to a fly-wheel and pulley of equal diameter, one on either side of the circular iron frame on which the machine is fixed. This engine is calculated at five horses power. The machines of Mr. Whitworth are—the patent duplex wheel turning lathe, the self-acting nut-shaping machine, with double cutters, to square two objects at the same time; a self-acting vertical drilling machine; a self-acting planing machine; a patent crank planing machine; a radial drilling machine; a patent slotting machine, of 6-inch stroke, to admit articles of two feet diameter; and a similar machine, with a 12-inch stroke, to admit articles of 3 feet diameter.

The well-known Butterley Iron Company exhibit an oscillating engine (No. 34, Class 5), the cylinder being suspended in the middle by hollow trunnions, through which the steam is admitted on one side and carried off on the other; the cylinder is 9 inches in diameter, and the stroke 18 inches in length. The attendant reports its power at 8 horses. The flax machinery of Messrs. Lawson is driven by the Butterley engine, including a sliver roving frame, a carding engine, two heckling machines, one fine spinning frame; a twisting frame, a fine spreading frame, and a first and second drawing frame.

The same engine also actuates Parker's patent mathematical power-loom for weaving sail-cloth (No. 77, class 6), and also his perning machine, of ten spindles.

No. 37, Class 5.—Evans's high pressure oscillating engine—the cylinder of which is hung at bottom, on transverse hollow trunnions—is calculated at six-horse power. It drives Crawhall's vertical rope-making machine, by which the whole process of rope-making is entirely completed; and it is believed to be the only machine of the kind in the kingdom, Huddart's exquisite rope-making machinery—fully described in the proceedings of the Institution of Civil Engineers—having lately been taken to pieces, and sold to different purchasers.

No. 45, Class 8.—Mr. E. Lloyd exhibits his patent double cylinder expansive engine, which gives motion to C. Schule's patent revolving mill. The cylinder of this engine is of 3½ inches diameter, with a stroke of 8 inches.

Pope's oscillating engine, of four-horse power, already illustrated and described in the ILLUSTRATED LONDON NEWS, gives motion to the throwing, winding, doubling, and reeling machines of Mr. Joseph Davenport; to the throwing mill of Mr. Frost; to Barlow's improved Jacquard loom; and, lastly, to the patent shuttleless loom of Mr. Reed.

STEAM-ENGINE.—BY EVANS.

Maudslay's double cylinder direct-acting engine drives their improved coining press, the cylinders of which are of 5 inches diameter, with a stroke of 16 inches, the power being calculated at six horses. It also gives motion to the following beautifully executed models:—1st. A pair of direct-acting double cylinder marine steam-engines, patented by Joseph Maudslay and Joshua Field, fitted with paddle-wheels and improved feathering floats. On this plan Messrs Maudslay and Co. had constructed machinery for marine purposes since the patent was granted to them of an aggregate power of 19,130 horses, and some of them of 800-horse, collective power. 2nd. A pair of direct-acting marine steam-engines, with oscillating cylinders, patented by Joseph Maudslay, on which plan and construction this well-known firm have furnished engines of the aggregate power of 2100 horses. 3rd. A pair of direct-acting double piston-rod marine steam-engines, peculiarly adapted for the shallow rivers of India and other parts of the world; patented by Joseph Maudslay and Joshua Field for the Indus and Sutlej, and for the Rhone, of the aggregate power of 545 horses. 4th. A pair of marine side lever beam-engines, on which plan Messrs. Maudslay and Co. have constructed 103 pairs, of the aggregate power of 11,358 horses. 5th. A pair of direct-acting annular cylinder marine steam-engines, patented by Joseph Maudslay, fitted with paddle-wheels and improved feathering floats. Engines on this principle have been fitted to several of the fleetest packets in the Channel; and they have altogether completed twenty-three pairs of similar construction, of the aggregate power of 2250 horses. 6th, and lastly. A pair of direct-acting marine steam-engines for driving a screw propeller, so constructed as to occupy but little space; and when fixed in the vessel to be entirely below the water-line. Thus we find that this celebrated firm have constructed marine engines on their various plans amounting in the aggregate to a power of 35,183 horses.

The great engine manufacturing firm of Messrs. Bryan Donkin and Co., having satisfied themselves of the applicability of the celebrated disc engine, exhibit one calculated at six-horse power on their improved construction, which gives motion to their disc water-mill, and also to their disc pump: the engine is of large size, having a disc of 17 inches diameter, and the continued leakage of steam, which was one of the great objections to this class of engines when first brought out, appears to have been entirely remedied. It also actuates the circular planing machine, drilling machine, and slide lathe of Messrs. Smith and Co., of Leeds; and likewise the centrifugal sugar-drying machine of Messrs. Rotch and Co. As this disc engine gave rise to a strong controversy among engineers when it was first brought out, and, indeed, for some years after, it may be as well to advert briefly to the history of its appearance in the mechanical world. About twelve years ago, we were called in to examine and report on two engines of this construction erected at the Bromsgrove Alkali Works, another at Wednesbury, and a third at Birmingham. The result of our examination and experiments was, that in point of economy of first cost, and foundation, and also of space, it was unexceptionable; but that in point of consumption of fuel there was nothing gained by its use: the paucity and simplicity of its parts were great recommendations, but still leakage was found to be a great obstacle; and Mr. Davies, a very ingenious mechanic and original inventor, made several improvements in engines of this construction subsequently put up. Davies was appointed mechanical manager of a company formed to build these engines on an extensive scale, of which company Mr. Rufford, the celebrated banker, who has lately figured away in the papers, was the chairman, and it is believed that until very lately he still retained a large share in the property of the Birmingham Disc Engine Company. At the first meeting of the British Association at Birmingham, a paper was read on the subject of this disc engine, the use of which was strongly opposed by some engineers. The late Mr. Stephenson, Mr. Robert Stephenson, Mr. Charles Fox, and Mr. Josiah Parkes, all visited the British Alkali Works, for the purpose of examining this novelty in the engineering world. Mr. Bishop, who was formerly connected with the Birmingham and Gloucester Railway Company, paid great attention to the improvement of the disc engine; and some time since erected one of his improved disc engines at the *Times* office, in Printing-house-square, which still actuates the vertical printing-press of Mr. Applegath, by which eight copies of one side of the paper are thrown off at each revolution of the vertical cylinder.

From the time of Watt until the present day a good rotary engine has been considered a desideratum; and, perhaps, upon the whole, the improved engines exhibited by Messrs. Donkin and Co., and Mr. Bishop, come nearest to the requirements of engines in obtaining direct circular motion.

Messrs. Clayton, Shuttleworth and Co., of Lincoln, exhibit their six-horse oscillating engine, which gives motion to Appold's centrifugal pump, which is close to Messrs. Donkin's machinery; and, immediately adjoining Appold's machinery, is Bessemer's horizontal patent centrifugal disc pump. Mr. Bessemer is well known in connexion with many important practical inventions of the present day. The general principle of Mr. Bessemer's pump is the same as that of Mr. Appold's; the former of which, however, is fixed horizontally, while the latter works vertically. Mr. Bessemer's centrifugal pump consists of an iron case composed of two parts, which are connected together by a flange, the whole resting on a foundation of brickwork and masonry. One compartment contains the disc, while in the other is fixed the wheel-work by which the disc is put in motion. A suction-pipe attached to one side of the case communicates with the water to be raised. The disc, composed of two circular metallic plates, connected together by several intermediate radial leaves or fans, is fixed on a shaft, working in proper brass bushes. By means of elastic washers under the heads of the screw-caps, the escape of water is prevented. Motion is given to the vertical shaft by means of a horizontal oscillating engine of 10-inch cylinder, and 21-inch stroke, calculated at six horses' power. The quantity of water

raised in a minute to a height of four feet is very large, as it is represented by a weight equal to twenty tons.

No. 310, Class 6.—R. Bradley and Co. exhibit an interesting model of a colliery in action, which is worked by a pair of small cylinders placed horizontally.

No. 418, Class 6.—Messrs. Robinson and Co. exhibit the largest and most powerful of the steam-engines in motion, being an oscillating engine, with the cylinder hung by trunnions in the middle, having a diameter of 18 inches, and stroke of 42 inches in length, calculated at 24 horses, which drives their large sugar-cane crushing machinery by means of motion communicated thereto by a series of cog-wheels. The cane is first placed in a proper inclined receptacle, and passes under and between large rollers of iron, by which the juice is expressed, falling into a proper reservoir, from which it is conveyed in suitable conducting pipes, to be collected for use; the residue of the cane is carried away by a series of laths connected with endless chains, also worked by the machinery attached to the engine.

Mr. Crosskill, the famous agricultural implement maker, of Beverley, exhibits his oscillating engine, the cylinder of which is also hung in the middle: it is of 7 inches diameter, with a stroke of 11½ inches. This engine not only gives motion to various mills contributed by Mr. Crosskill, but also actuates the tenoning, planing, and mortising machines of Mr. Furness, which were partly brought into requisition in the construction of the Crystal Palace, and which have already been described and represented pictorially in the pages of this Journal. It also gives motion to Mr. Dakin's coffee-roasting apparatus.

It is generally allowed that the French know full well how to prepare coffee so as to make it quite palateable; but in our country we are only just learning the art of roasting coffee in a scientific manner. The desiccating process of Messrs. Davison and Symington is perhaps the most perfect mode of accomplishing this desirable object; but it is only now and then that we are fortunate enough to meet with coffee prepared according to their system, which consists in placing the berries in revolving cylinders, and subjecting the contents to an exposure for a given time to hot currents of air until all the berries are uniformly roasted: the currents of highly-heated air are driven by a fan at considerable velocity. The flavour of moderately good coffee, prepared by Davison and Symington's plan, is exceedingly uniform and delicate. Mr. Dakin's method has also made some stir in the world on account of the cylinders in which his roasting is carried on being either of silver or an alloy of that metal; and his apparatus is shown in motion among the Machinery in Motion, though, of course, the roasting is not permitted to be carried on there. Instead of exposing the cylinders in which the coffee is placed to the direct action of the fire, an outer cylinder is provided, the whole being placed within an oven. The cylinder, as already mentioned, is made of an alloy of silver, in order to prevent the injurious effects produced on the flavour of the berry by the use of iron. In the cylinder are proper grooves, to suit a long slide, by the removal of which the coffee is placed in the cylinder. When in action, on account of the close fitting of the slide, the cylinder is rendered nearly air-tight. The end-plates of the cylinder are provided with bosses, placed centrally, to which the shaft is secured. The shaft is made hollow, for the purpose of receiving a long taster, by which a portion of coffee may be removed from the cylinder while the whole is in motion, the shaft having a slit in it for the above purpose. The cylinder can be moved in and out of the oven at pleasure. Mr. Dakin attaches great importance to the particular temperature at which the hot air is admitted to the cylinder.

Middleton's vertical cylinder direct-acting engine, with cross-head and double crank, gives motion to Applegath's vertical printing-machine, by which the Exhibition Supplements of the ILLUSTRATED LONDON NEWS are printed weekly. Applegath's machine is of first-rate workmanship, and was constructed by Mr. Middleton, who supplies the power to work it. The same engine gives motion, when required, to a new folding-machine, which, by permission of the proprietor and exhibitor, Mr. Ingram, stands within the wooden dwarf inclosure of the vertical printing-press.

M'Clure and Co.'s lithographic press, on the other side of the passage, on the eastern side of the inclosure, as above, is also actuated by Mr. Middleton's engine.

Contiguous to M'Clure's lithographic press, we find Messrs. Hopkinson and Cope's 2½-horse engine (5-inch cylinder, 14-inch stroke), with cross-head on the old plan, working the Scandinavian horizontal printing-press exhibited by Mr. Hopkinson, and also the perfecting machine of Mr. Napier.

Near to the above are the centrifugal hydro-extracting or drying machines of Messrs. Manlove and Co., which are driven by a two-horse vertical cylinder engine in connexion with bevelled cog-wheels, working into smaller wheels placed horizontally, and which give motion to two vertical spindles, on the bottom of each of which is a rigger, from which motion is communicated to the pair of revolving copper vessels, in which clothes, sugar, and other articles are rapidly dried by the centrifugal action of the machine. The process of drying sugar by this machine is merely to place the raw material in segmental cases of gauze wire into copper vessels, and subject the whole to centrifugal action, when the treacle is rapidly extracted, and most beautiful crystalised sugar is left behind, samples of which may be seen, and perhaps tasted, by those curious in such matters. At Bristol there are as many as forty machines of similar pattern in one establishment.

No. 43, Class 5.—Messrs. Bunnett and Co., well known for their metallic outside shutters, exhibit their patent concentric reciprocating engine, with double action, suited either for high or low pressure steam, which is worked expansively. This engine is without the ordinary gearing or tappets, having a fly-wheel on one side and large pulley on the other, according to the plan so generally adopted by the exhibitors of machines at the Great Exhibition; the piston (6½ inches by 3 inches) works in a semicircular passage, having a 12-inch stroke. This machine is calculated as of four-horse power.

Messrs. Barrett, Exall, and Andrews exhibit, in connexion with their biscuit-making machinery (described in the ILLUSTRATED LONDON NEWS of August 2), a small Brunel engine of 1½-horse power. This engine also gives motion to a model of their patent safety horse-works.

No. 41, Class 5.—Nasmyth and Co. exhibit their improved engine, working the piston vertically, and having fly and pulley as in common use, by which motion is communicated to the large printing-press of Messrs. Napier and Sons. The cylinder of Nasmyth's engine is of 7 inches diameter with a stroke of 9 inches.

Near to the above, Messrs. Rennie exhibit, in connexion with Bishop's improved disc engine—to which we have already alluded while describing Messrs. Donkin's contribution—a screw propeller, showing how very suitable this kind of engine is as an auxiliary power in sailing-vessels.

The envelope-folding machine of Messrs. Waterlow, which we have already described, is also actuated by Bishop's disc engine.

No. 49, Class 5.—Messrs. Collinge and Co. exhibit, on account of its simplicity, their portable direct-acting high-pressure engine, of 5-horse power, already described in the ILLUSTRATED LONDON NEWS, and standing near to their sugar-cane crushing machine and improved screw jacks.

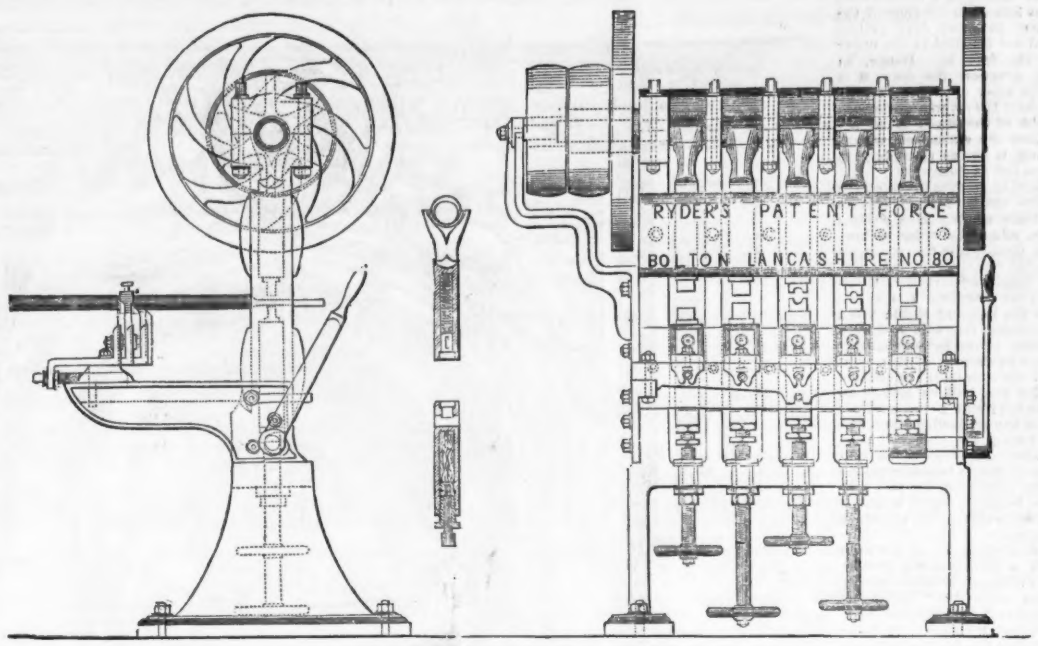
In connexion with his hydraulic crane, Mr. W. G. Armstrong exhibits a small engine with horizontal cylinder of about 1¾ inches diameter, and 3-inch stroke, which is estimated at one-third of a horse power.

No. 11, Class 5.—Messrs. Hawthorn, celebrated as the makers of locomotive engines, have also, of late years, turned their attention to the manufacture of fixed engines, and we find an oscillating high-pressure engine of their construction—without slide valves, eccentrics, or gearing—giving motion to the pulverising sugar machinery of M. Hermann, of Paris; which, with the machines of M. Flaud, placed in close proximity thereto, are the only machines from France exhibited in motion. Messrs. Hawthorn's engine has a cylinder of 3½ inches diameter, and a stroke of 8 inches in length.

507. M. Flaud, of Paris, exhibits a small direct-acting engine of five-horse power, to work his machinery for planing wood. It will be easily found, as being the first engine in action, starting from the east end of the large court occupied by the Machinery in Motion, which certainly appears to attract as large a number of visitors on each exhibition-day as any department of the great international display.

RYDER'S PATENT FORGING MACHINE.

THE forging machine of Mr. Ryder, of Bolton, is placed a little to the west of Appold's pump, and when in action attracts its share of wondering visitors. In consequence of fire not being permitted within the "wooden walls" of the Palace of Industry, this machine is not shown to full advantage; nevertheless, by the use of lead, instead of iron and steel, the materials usually brought into subjection by its mighty power, the use of the machine is demonstrated In a case contiguous to the machine, various kinds of rollers are exhibited by Mr. Ryder for different purposes, such as mule and throttle spindles for cotton machinery, screw

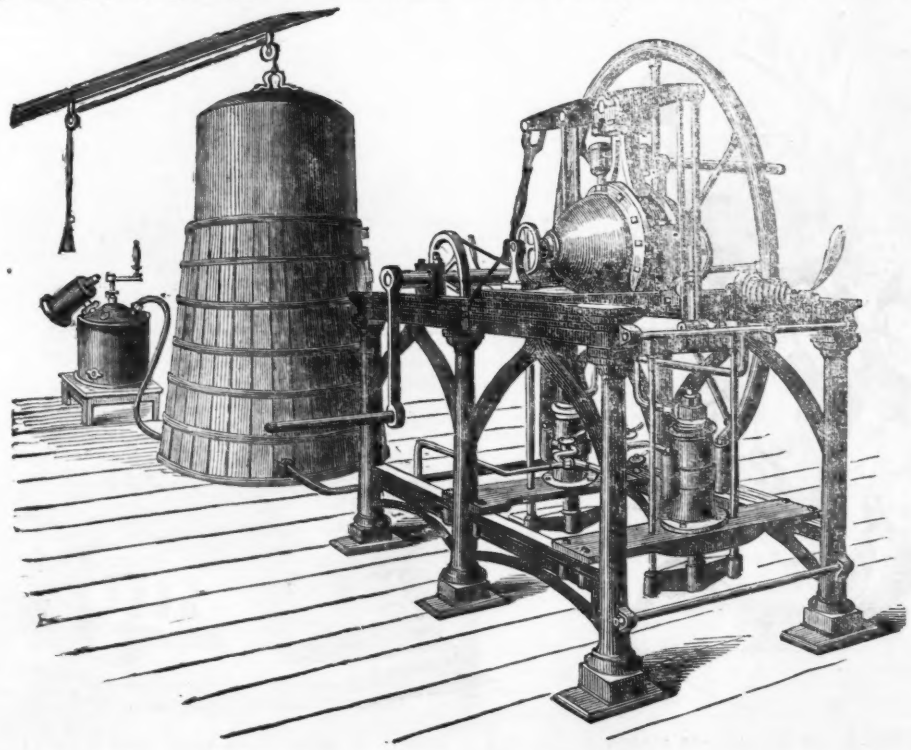


RYDER'S PATENT FORGING MACHINE.

bolts, and also round, half-round, square, flat, and "three-square" files respectively, all of which have been formed by similar machines. That shown in the Exhibition is worked by an oscillating engine having a 7-inch cylinder and 9-inch stroke: a horizontal shaft, which is caused to rotate by means of the crank, carries on it a metal pulley of 16 inches diameter, from which a band passes, when in ordinary use, to drive a fan of 17 inches diameter, but which, for the reason already stated, is not required to be used in the present instance. The fly-wheel is on the same shaft, a band from which passes to a 12-inch driving-pulley, running on a second shaft, by which five eccentrics are worked, and by which as many hammers are caused to fall at proper intervals, each of which is again lifted up by a spring; this operation is repeated 700 times in a minute. Under each hammer is an anvil, furnished with flat and other dies, on which the steel or iron to be operated on is placed—being kept in its proper position by a rest in front of each. The dies may be raised or lowered at pleasure, by means of vertical screws turned by circular open handles. The whole is mounted in a strong frame, and by means of bolts passing through the iron base plate is firmly secured to the joists of the floor.

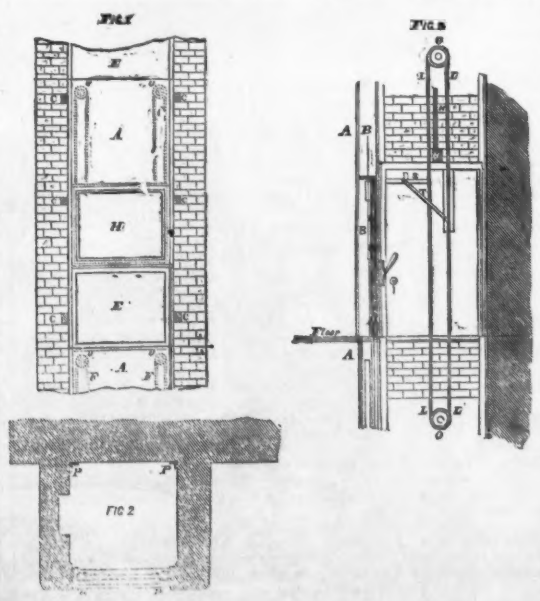
SODA-WATER MACHINE. TYLER AND CO.

There are several soda-water machines exhibited in the Crystal Palace, many of them kept in active operation, and popping away right and left as they supply the demands of thirsty votaries. The principle



SODA-WATER MACHINE.—BY TYLER.

of all is generally the same—that of forcing a certain amount of carbonic acid gas, in combination with water, into strong glass bottles, which are then corked and securely wired. Sometimes the water is additionally medicated by the introduction of a certain quantity of alkaline matter previous to the impregnation with carbonic acid gas; but this is not always the case. The machine which we have engraved is that of Tyler, Hayward, and Co., which is adapted for two bottlers, and, acting on the continuous principle, is capable of making 300 dozen bottles a day. The condenser, seen in the centre of the upper frame, is of gun-metal, tinned or silvered inside; and, being separated by a partition in the middle, acts as two condensers.



BELLHOUSE'S FIRE-PROOF DOORS FOR WAREHOUSE HOISTS.

BELLHOUSE'S FIRE-PROOF DOORS FOR WAREHOUSE HOISTS.

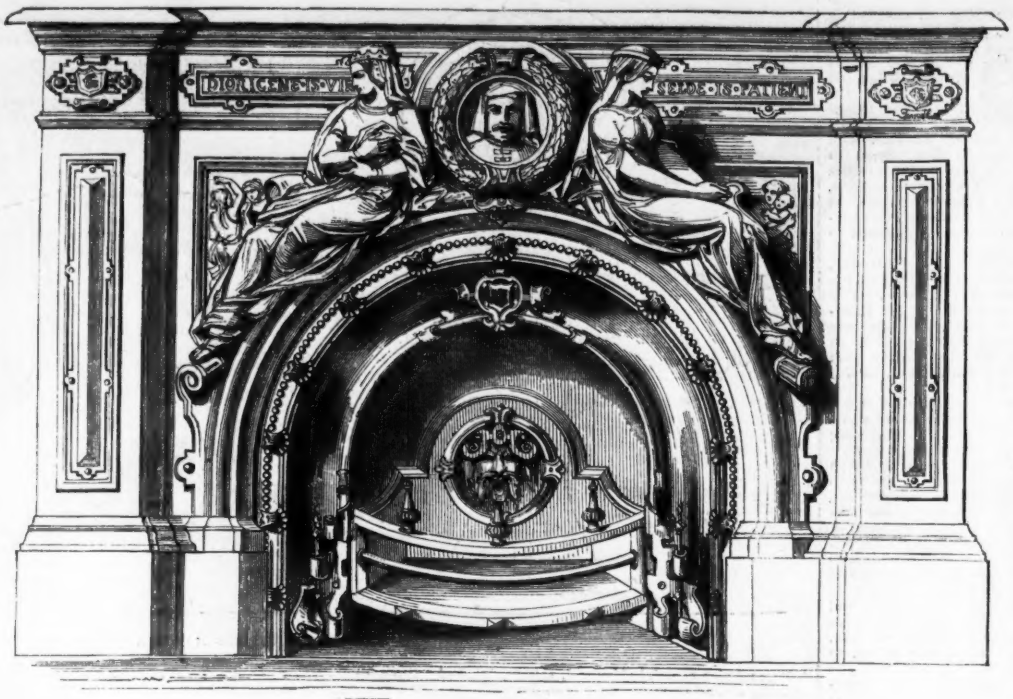
The recent fires in Manchester—especially those of George-street and York-street, and more particularly that of Westhead's warehouse, in Piccadilly—have caused every feasible scheme for the prevention of this disastrous cause of destruction in so vast a town, whose buildings are chiefly filled with stores of valuable produce, to be regarded with attention. In the manufacturing districts, generally, where the warehouses and factories are a considerable height, consisting of many stories, the ordinary staircase is generally superseded by the "hoist" or "lift," which is precisely the same thing as the well-hole of an ordinary staircase previous to the stairs being fixed therein, but with the addition of the hoisting or lifting apparatus. Mr. Bellhouse, who is an extensive builder in Manchester, has particularly turned his attention to a mode of preventing such well-holes from becoming, in cases of fire, large ventilating shafts, which naturally cause the fires to rage with greater fury. The means which he has adopted for this purpose, and a model of which will be found in the machinery department of the Exhibition (Class 5, No. 416 in the *official* catalogue), consists of iron doors sliding vertically in grooved frames of the same material, so that the communication between the different floors of the building and the well-hole may be entirely shut off in cases of fire.

The Illustrations consist of an elevation (Fig. 1), plan (Fig. 2), and a section (Fig. 3).

Hollow iron bricks (c c) are built into the brick walls of the well-hole as the building progresses; b b are side jambs of cast iron, having slides for the doors, the jambs being bolted to the hollow bricks; A A, stationary plates of cast iron bolted to the side jambs, which plates form the lintel in the case of one doorway and the sill of the next; H and E represent two sliding doors, the former opening upwards, and the latter downwards. The doors are moved either upwards or downwards by means of chains (F F), which are attached to the upper angles of the door

(H H); the chains pass downwards, in grooves formed in the sides of the upper door (H), and over pulleys (U U), and are fastened to the upper side of the door H. Hence, in whatever direction the door H is moved, the other door (E) must necessarily have the reverse movement. The weight of the doors is so adjusted, that the excess of weight in the door H causes them both to close when left to themselves.

The slides or grooves in which the doors move are so arranged as to prevent them coming into contact with each other. In order to keep the doors open while the cradle is being loaded or unloaded, an apparatus of simple construction is attached to its interior. S is a bolt sliding to the left and right; T is a link connecting the bolt S with a point which slides perpendicularly in a groove as shown. If this point be moved upwards from the position shown, the bolt will be moved towards the left; and if the cradle is stopped at any particular place, and the doors open, the bolt will keep them in that position; but as soon as the cradle has to be removed, the bolt being withdrawn for this purpose, the balanced doors H and E are allowed to close. Let us take a case: the cradle has been left opposite to a door at the top of the well-hole, and a person at the bottom wishes to liberate the hoist, having first given notice by "Whishaw's telekouphonon," or speaking telegraph, of his intention; he withdraws the bolt S S, by means of the rope passing over the pulleys O O, at the top and bottom of the well-hole, and at the same time ensures the closing of the doors as already mentioned. By these self-closing arrangements, none of the apertures communicating between the apartments and well-hole need be left open, and the sliding doors are themselves fire-proof.



FIRE-PLACE, BY MR. JOHN THOMAS. STOVE, BY MESSRS. FEETHAM.

COLLINGE'S SCREW-JACKS.

Near to the sugar-cane crushing machine, as above described, are two screw lifting jacks by the same firm; the one consisting of a powerful screw turned in its nut by means of a lever, and capable of raising a load equal to from ten to twelve tons, while in the other a greater facility of motion is obtained by means of the introduction of a worm and wheel, instead of the ordinary lever, which in some cases cannot readily be applied. In raising sunken buildings generally, these jacks are especially useful.

FIREPLACE. BY J. THOMAS

This is altogether a very classica production, in marble, the carving of the figures being exceedingly creditable as works of art. The grate is handsome and serviceable.

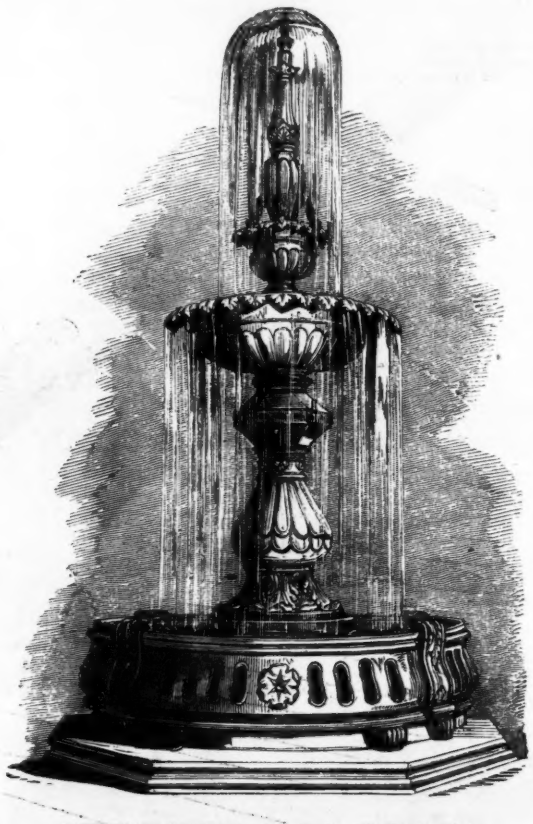
TWO PANELS IN CANNABIC. ALBANO.

We introduced Mr. Albano's cannabic decorations to our readers in our Supplement of the 23d August. The two specimens which we now engrave—a panel of dead game, and a panel of fish, &c.—spirited productions in themselves, will illustrate the variety of designs to which this new material has been applied.

EARTHENWARE FOUNTAIN. BY RIDGWAY AND CO.

Ridgway and Co., of Newcastle-under-Lyme, besides their general assortment of tea and coffee services in English porcelain, exhibit various earthenware fountains for gardens and conservatories, very pleasing productions, of which we present a specimen.

PANEL, FISH, &c., IN CANNABIC.—BY ALBANO.



EATHENWARE FOUNTAIN.—BY MESSRS. RIDGWAY AND CO.

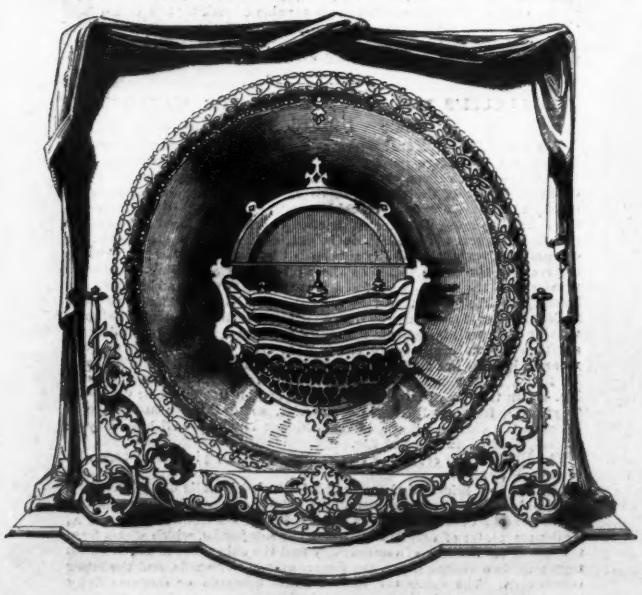
PANEL, DEAD GAME, IN CANNABIC.—BY ALBANO.

STOVE. BY FEETHAM.

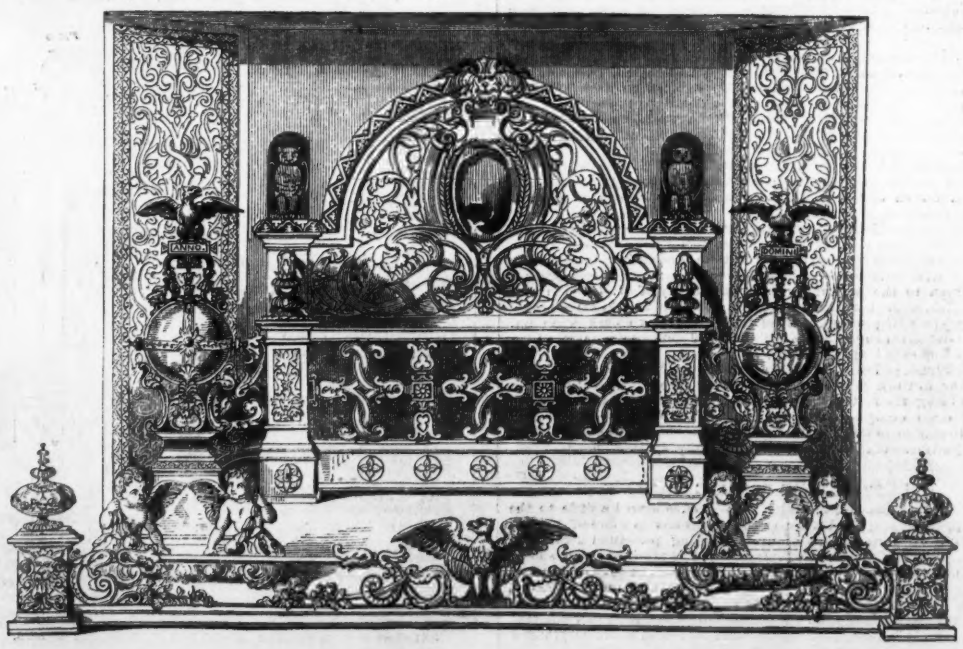
Feetham, of Clifford-street, has several choice and curious works in the Elizabethan and mediæval styles; and not the least so is this very handsome stove, which is all of admirable workmanship, highly polished, and enriched with or moulu. It is altogether a very carefully studied and creditable production.

STOVE. BY JOBSON AND CO., OF SHEFFIELD.

A very elegant production, after the new semi-spherical fashion which has peculiar properties of throwing out heat.



STOVE.—BY JOBSON AND CO., SHEFFIELD.



STOVE.—BY FEETHAM, CLIFFORD-STREET.

CHURCH MEDALS. BY J. WIENER.

M. Wiener, of Brussels, exhibits a collection of very beautiful medals, representing the principal cathedrals and other public buildings in Belgium. In the case of religious edifices, the exterior is given on the obverse, and the interior on the reverse of the medal; in the case of

CHURCH MEDAL.—BY J. WIENER.

other edifices, the reverse is occupied with a ground-plan of the building. We have engraved several of these little memorials.

The church of Notre Dame, at Tongres, is a very ancient foundation, which was devastated by the Huns, and rebuilt in the time of Charlemagne. The church of St. Martin's, at Ypres, was founded early in the eleventh century. Both are very fine and interesting relics of antiquity. The Bishop's Palace, at Liege, is a most remarkable building of the middle ages, having been built by Cardinal Bishop Erard de la Marck, in 1533. It is now the Palais de Justice. The view given is of the interior court, the stunted columns of which have some resemblance to those of the Ducal Palace at

CHURCH MEDAL.—BY J. WIENER.

Venice. They are the more curious, from the fact that each pillar is carved with a pattern different from all the rest.

CLARET-JUG, &c. BY REID, OF NEW CASTLE.

The claret-jug and bread-basket exhibited by Reid, of Newcastle, are in every respect highly creditable specimens of silver work, being elegantly formed, and richly chased and engraved.

ASTRONOMICAL TELESCOPE. BY A. ROSS.

This very fine telescope occupies a conspicuous position in the centre avenue of the Western Nave. The tube is 20 feet in length, and

CHURCH MEDAL.—BY WIENER.

CLARET JUG, &C.—BY REID, OF NEWCASTLE.

TELESCOPE.—BY ALEXANDER ROSS.

the object glass 11½ inches in diameter. It is mounted on a stand, with equatorial movements and complete adjustment.

TABLE. BY LEISTLER.

This very handsome table, we think, completes our Illustrations of Leistler's furniture in the Austrian department. It is of a character with the other works, massive, yet elegant; bold and fanciful in deviee, and masterly in the workmanship.

CHURCH MEDAL.—BY J. WIENER,

BEDSTEAD. BY DOWBIGGIN.

The carved walnut-wood bedstead, with cornice, displayed by Messrs. Dowbiggin, must be classed amongst the most elegant and successful productions of its kind in the Exhibition The carving is rich and elaborate in design

CHURCH MEDAL.—BY J. WIENER.

without being obtrusive in the treatment, and the execution highly finished.

ORNAMENTAL SLATE TABLE-TOP. BY MAGNUS.

The various manufactures in slate, of which specimens are exhibited by Magnus, of Pimlico, are very beautiful in themselves, and are important as offering a new description of decoration for domestic purposes, which may be adopted with advantage. The enamelled slates represent various marbles inlaid after Florentine mosaic and other patterns; and the durability of the material, combined with the high polish it is capable of receiving, is a consideration very much in its favour. We engrave one specimen, an ornamental table-top.

ORNAMENTAL SLATE TABLE-TOP.—BY MAGNUS

TABLE.—BY LEISTLER.

END OF BEDSTEAD.—BY MESSRS. DOWBIGGIN.

SADDLERY AND HARNESS.

(Class 16. North Side, West Nave, next to Furs.)

We have already alluded in general terms to this subject; but the display of saddlery, although far from completely representing this important branch of British manufacture, demands something of a detailed notice, in justice to several exhibitors who have sent articles, not only excellent for workmanship, but novel in design. We will begin with

Saddles.—English saddles may be divided into at least six classes; that is to say, those used for riding on the road or hunting, for racing, for the infirm or lame, for military purposes, for ladies, for children, beside the cheap articles made for exportation. The ordinary English saddle differs from that of all other countries, in the circumstance that it is constructed for the every-day use of horsemen, who can ride without other help than the balance of the stirrups and the grasp of the legs and thigh, who do not need either high pummel in front or high spreading cantle behind. In this country it is presumed that all ordinary shaped saddles may be used for hunting, and in hunting it is indispensable that the horseman should be able to slip away from his falling horse with the greatest possible ease. It is the universal passion of Englishmen for the chase which has driven the old-fashioned and rather comfortable demi-pique saddle out of fashion, ever since fast riding to hounds came into vogue. We are also the only nation that rises regularly in the trot, and that motion requires a flat saddle. As the best customers of our saddles are hunting men, they have rendered universal a form which is the best for sportsmen, but very trying for foreigners. The demi-pique saddle, still in use in France, Spain, and South America, when well made, affords a very comfortable seat on long journies on an ambling or cantering nag; but a roll over in topping a gate or wall in a French saddle would be certain death by impalement.

The only concessions permitted to timid, invalid, or lame riders, are in the way of saddles padded so as to support the thigh and press against the knee. These are commonly called "Somersets." Several specimens of equal excellence are exhibited, on some of which a one-legged horseman might find great assistance. Mr. Phillips, a celebrated master of hounds in Wales, has only one leg. These are all worth examination, because it is a mistake to imagine that all persons who ride know how to sit. There are a very considerable number of persons who begin to ride late in life, either because they are then, for the first time, able to afford the amusement, or because they take it not as pleasure, but as physic, by their physician's orders. Such persons will act much more wisely in purchasing a saddle well padded before and behind, and stuffed, than in running risks and making themselves ridiculous on a smooth plain hunting saddle. A great many attempts have been made to produce an elastic saddle, but with moderate success. Except for a very heavy man, an elastic saddle is a mistake. Steel springs, stretched webbing, and, lastly, caoutchouc cloth, have all been tried; but all the expedients for affording a soft seat have the same fault—after a short time the springs break, the webbing or India-rubber cloth stretches, and the saddle is spoiled. Good stuffing, covered with a thin waterproof cloth to protect it from the effect of a thorough wetting, will continue to form the best seat, until some mode is invented of removing worn-out bands. A saddle tree is exhibited, covered with vulcanized India-rubber, which would perhaps answer as well as anything of the kind.

The best "old gentleman's" saddle in the Exhibition is (No. 72) by John Weir, of Dumfries, which is made of one piece of buckskin, without flaps, wadded, but so edged with hogskin, that when mounted the rider's person covers all the white leather. It would be very comfortable and easy to sit for the fattest man and clumsiest rider on common roads. The arrangement of the stirrups under the flaps would make it scarcely safe for hunting. Cox, of Walsall (55), has a new registered stirrup, which, although very ugly, is a move in the right direction, and would be an improvement to Weir's saddle. The stirrup hangs from a single strap, always in the right direction for use, and so may obviate the necessity of groping with your toe for the stirrup after dismounting, just as your horse is rising at a tough bullfinch. This form would be an improvement for ladies' stirrups, where the stirrup leather is fastened on the off-side; but Mr. Cox's arrangement of an improved buckle without a tongue is quite inadmissible, as it would come most painfully against the leg of the horseman.

Mr. Ramsey, Hull (74), shows an elastic saddle, with very high testimonials; but in this, as in many other instances, without a dissection first, and a long trial afterwards, it is impossible to say anything positive.

Hudson (60) and Lennan (61), both of Dublin, display excellent workmanship in hunting and steeple-chase saddles: they are neat and well cut, good material, and light. The 8lb. steeple-chase saddle of the latter is as good as anything of the kind in the Exhibition. But if our Irish friends wish to do any business in London, they must begin by undercutting the preposterous London prices. At present, the man who goes with money in his hand to one of the best saddlers has to pay at least £2 extra, because other customers take four years' credit. Colegrave, Brighton (97), has a saddle fitted with springs, attached to the girth straps (a patent), to avoid the dangers of over-girthing. It must be expensive, soon out of order, and rarely necessary; good girths are elastic enough.

A much better thing of the kind is in No. 101: a saddle by Gibson, of Coventry-street, fitted with Reed's Patent Girth Regulators. Every one knows the awkwardness of having to take up the girths a hole or two on the hunting-field, on a hot fidgetty horse, after a sharp burst on a moist woolly day. The flaps of the saddle are probably covered with mud; and, whether you dismount or sit on, you get the benefit of a streak of clay on your hands, your breeches, or your hat, while pulling at the girth tongues. By Reed's Patent, a small lever on the principle of a ship's capstan winds catgut, to which the girths are attached on a metal roller. The idea is extremely good. The girths may be tightened at cover side, or even when cantering along, without lifting up the flaps of the saddle; but the mechanical arrangement might be very much improved, and, for that end, we direct the attention of our Walsall and Birmingham readers to it.

Thomas, of Stratford-on-Avon (76), sends flexible saddles, which are said to yield to the motion of the horse, and yet allow a free current of air between the back and the saddle. This is very desirable; but without a trial it is impossible to do more than direct attention to the promise.

Although there are plenty of good hunting saddlers, there are no other hunting saddles displaying any novelty among the few exhibited. It is to be regretted that the Walsall manufacturers have not made the class more complete by sending the good plain cheap saddles which they manufacture so largely for the foreign markets, at from 20s. upwards.

Racing Saddles.—Several are shown; but for form, workmanship, and weight, nothing can exceed the one exhibited in No. 50 by Mr. Cooper, of York. The whole case is highly creditable; and the racing saddle has been pronounced by one of the leading members of the Jockey Club the best he ever saw. This is worth noting because the maker has spent the greater part of his life in itinerating from farm to farm in the Dales of Yorkshire, mending cart harness, and is almost self-taught as to fine work and taste. His Somerset saddle, also, is a piece of right good workmanship.

Side-Saddles.—Of these a goodly number are displayed, chiefly differing from each other in ornament. Several have Berlin wool-work or tapestry let into the seat and the near-side crutch. There is something pleasing to young ladies in the idea of turning their eternal fancy-work to some useful purpose; but the fashion will be of short duration, unless a mode can be found of cleaning the red, green, and blue worsted flowers without damage. The same objection, in a less degree, applies to white buckskin coverings on a saddle. It requires time and trouble to clean, and is only fit for those rich enough to have more than one. The greatest improvement in side-saddles consisted in the introduction of the third crutch, or, as it is sometimes called, the hunting horn-pummel; if this be well placed, the opposite crutch is rendered quite unnecessary, and the seat of a lady becomes as firm and safe under all circumstances as that of a man. Another improvement consists in making the cantle flat. The best side-saddle, without exception, in the Exhibition, is that sent by Urch, close to No. 86, covered with brown buckskin. It is very light (only 12½ lb.), elastic, yet sufficiently strong. We had an opportunity, by sitting on it, on the stand, of ascertaining that the hunting horn-crutch is not only well placed, on a level with the seat, but elastic; and this is very important, for, if rigid, the knee tires in a long ride. The weight is about half that of ordinary side-saddles. Now, unnecessary weight is not only bad for the horse, but a great inconvenience in saddling, for all grooms are not tall and strong-armed; sometimes a gentleman has to saddle himself.

Hicks, of Edward-street, Portman-square, has (84) a handsome side-saddle, with an "elastic support for the left thigh," provisionally registered. This may be useful to very stout ladies. The contrivances for riding on the off as well as near side may be useful in long marches in India or Australia and for deformed ladies, but are not often required. The same may be said of the bolts for allowing the near crutch to fall down, and save a lady the trouble of lifting her leg and habit over it in dismounting. As for the precautions against a fall in riding on a road, according to our notion, people who expect to fall ought never to mount. The plain spring stirrup has quite superseded the clumsy covered slipper.

Bridles.—The varieties in bridles may be counted in thousands. Among those exhibited are several for stopping or holding *pullers*; but if neither an ordinary double bridle, a chifney, or a double snaffle with gag, will hold a horse, the best way is to get rid of him. No. 278 (in the Carriage Court) is a contrivance for stopping a horse by closing his nostrils with an elastic band; not a new idea, nor, we suspect, a very useful one. The display of Brace (58), of Walsall, is very interesting. It consists of the magnificently chased stirrups in gold and silver plate, spurs, bits, and other ornaments manufactured for the South American market, and particularly for Mexico and Cuba, where the horse trappings of a cavalier of fortune will sometimes cost £1200.

In the East Nave, opposite Tunis, may be seen an extremely elegant white bridle, linked with silver, exhibited by Peat, Old Bond-street, "made of untanned (green) hide, made in the province of Rio Grande da Sal, Brazil, by the less civilized inhabitants." As a fancy or lady's bridle, it is a very much prettier article than anything in the English department.

Earnshaw (107) exhibits a very magnificent blue morocco bridle, with gold ornaments, very nicely designed, which is fit for a Field-Marshal Prince, or Emperor Generalissimo. Middlemore, Birmingham (67), has some very handsome ladies' bridles and whips; and Ashford (64), of the same town, shows a bridle of caoutchouc, of neat shape, and cool neutral colour, which we fear would not stand wear. The same firm have an ingenious registered invention for driving-whip sockets, in which an India-rubber ring keeps the whip tight. In the same case is a pretty red whalebone whip.

In children's saddles nothing novel or particularly good is to be found. Yet there have been one or two recent improvements of merit, particularly a boy's saddle with a peak at the cantle, and convenience for passing a strap round a child's waist, so as early to give a good seat.

Harness.—A good deal of harness is shown: the leather a good colour, and well tanned, the sewing neat, but the design for the most part clumsy and tasteless. There is great room for judicious ornament in harness, but the designs seem almost all stereotyped copies of ugliness. Without alluding to those which we cannot admire, we may refer to No. 91, by Penny, of Union-street, a state pony bridle for the Prince of Wales, designed by W. H. Rogers; to No. 104, harness by Machie, of Maidenhead; and 90, by Blyth, of Park Lane, a harness pad of good workmanship and elegant design; and also 77, by Cuister.

But decidedly the best thing in the way of improvement in harness is White's invention (No. 86), by which the ugly, clumsy, inconvenient buckle of the traces and the crupper is superseded by a hollow cylinder of leather and metal, which, when in use, lies flat: when there is any need to alter the length of the traces or crupper, a peg attached to a medal slide can be opened, the hole of the trace moves either way in a moment, instead of requiring you to struggle to unfasten the tongue of a huge buckle. It is difficult to describe this invention without a drawing, but it is both simple and useful. The same harness, exhibited on a wooden horse, has improved gig harness tugs, for confining and releasing the shafts rapidly.

In cart harness, Vick, of Gloucester, shows an excellent set made after the Scotch model (267 in the Carriage Department), with a shifting point of draught in the collar; altogether strong, neat, and not too heavy. But still in this, as in all the Scotch cart harness exhibited, there is too much iron-work to be kept bright for ordinary farm use. A carter ought to have enough useful work to do, without spending time in polishing harness.

A number of collars in the English and one in the Belgian department are exhibited as improvements, but of the greater number it is impossible to judge. There is an air-blown collar, which is capital in theory, because it can be blown to the requisite fit, and a good fit, no matter how heavy, never galls the shoulders; but who would venture on a journey with a collar that might be destroyed in a moment by a nail or pin. The Belgian is a very likely cart-collar, although rather too clumsy for our taste. Birmingham sends a neat straw collar; but one of the best seems one from Musselwhite, of Devizes (No. 71), stuffed with cork and horse-hair, and opening at the top, so as not to require forcing over the head. There is also a clever collar used in the Artillery, which is shown in the Carriage Department; but in this instance, as in many others, the absurdity and, indeed, uselessness of the shilling Catalogue is forced upon our notice. There is no division, either in the Catalogue or the numbers, between tambourines and drum-heads, wooden bellows and the saddlery; while, as to the cart harness, a matter of great importance, for it surely needs improvement, the Catalogue is of no more use than an obliterated sign-post on a dark night.

As a whole, British saddlery, either wholesale, for exportation, or retail, is very imperfectly represented.

The best point about this class is, that it has enabled our Irish and provincial saddlers to show that, at moderate prices, they can compete in utility and finish with the expensive London trade.

The foreign saddlery is for the most part an inferior imitation of English, although Paris sends some articles very respectable, except in metal-work.

We very much admired some white flax cord reins exhibited in the Belgian section. They would be just the thing for ladies, as they will wash and keep their colour.

Among the woollens on the south side, Mr. Bliss, the cloth manufacturer, of Chipping Norton, exhibits several sets of horse-clothing, of excellent quality and neat pattern, to which we call attention, because it was the father of the present manufacturer who first made the warm horse clothing now universally used. Before his time, horse clothing was made of the thin serge which we sometimes see on inferior horses for sale at a country fair.

It is possible that we have overlooked several improvements in saddlery and stable economy, but the exhibitors must blame not us but the Catalogue and classification. It would have paid one of our principal saddlers to have exhibited in one case all the tools of a hunting stable, from the most improved curry-comb to the gas singeing lamp, which bids fair to supersede the clipping scissors.

We must not conclude without noticing the magnificent embroidered velvet military saddle with gold ornament, contributed by Cuff, Cockspur-street (No. 96); but, splendid as it is, India and Egypt both outvie it, and there is nothing to compare with the Indian bridle of velvet and emeralds, which, although unfit for our climate and our sober costume, is admirably adapted for the country for which it was manufactured.

From saddlery and harness we are led naturally to improvements in *Hunting Costume*, of which there are two notable examples in the Exhibition. In the centre of the Nave, opposite Furs, is a case of Boots and Shoes, Class 16, No. 179, where Gilbert and Co., Old Bond-street, exhibit a great improvement on the long black hunting-boots which are so much used now in wet weather in muddy woodland counties. As ordinarily made they look extremely neat, are cleaned with a simple sponge and water in a moment, and, covering up to the middle of the thigh, are a better protection against mud and rain than any overalls. The disadvantage of this kind of boot has consisted in the wrinkles in the bend of the knee, which are often painful and always disagreeable; if the boot was loose, it flopped down; if tight, the rider was in an agony on dismounting. Messrs. Gilbert have registered an improvement, which consists in neatly introducing a piece of caoutchouc spring, covered with leather, under the knee. A gore of the same material at the top of the boot would be a further improvement. We may observe, that there are many specimens of that blessing to sportsmen of moderate means, the *Patent Leather Napoleon Boot*. Top-boots, whether of the latest fashion (brown), or ancient pink tops, are all very well for the tall muscular man, with a servant at command to clean half-a-dozen pair *secundem artem*; but for dumpy figures and those happy souls with one or two horses and no servant, patent leather are a great comfort and economy. They look well, and are always ready for use. As all exhibited are good, it would be unfair to point out any in particular; but we would hint, that white stitching, and red or yellow edging to a hunting-boot, are no recommendations. Mr. Christy (Class 20, No. 35) has sent a capital specimen of a new hunting-cap, of felt, to be seen in his case of hats in the South-east Gallery of the Transept. It would be improved by borrowing the peak behind from Buckmaster's model helmet (No. 1) in the same class. The peak would throw off the rain, but must be neatly made, so as not to look like a coalheaver's tile. Hats are an abomination stall times, but a hat in hunting, although patronised by certain sporting critics, is an absurdity only less absurd than the bear-skins of the Foot Guards. On a windy day, in galloping through a woodland, or getting out of cover, the hat is as much trouble as the horse, gets spoiled, and sometimes lost; while a cap, if well made, sits close, does not catch the wind, protects the eyes from switches, the head in a fall, and is becoming to most faces. But velvet absorbs rain, and is too soon spoiled in a wet season; therefore, we hope to see Mr. Christy's felt cap patronised. Lincoln and Bennett have sent hunting-caps of the same material as silk hats; but, as they are neither numbered nor classified, we cannot say where they will be found. We are decidedly of opinion that the hat reform must take the hunting-cap as the foundation, because it has certain undoubted advantages. It sits firmly on the head, and saves the eyes from the light. So thought General Sir Charles Napier, while in India; and, for his imitators, caps are exhibited in white and green velvet. We do not see any improvement in spur-fastenings, although there is plenty of room for an ingenious man. Buckles are always breaking.

EXHIBITION NOTES.—No. V.

The gradual increase of the number of foreigners, recently so observable within the Great Exhibition, in the streets of London, all places of amusement and public resort, steam-boats in every direction, railway trains (especially the South-Eastern, communicating with the coast, on which the sudden and casual rushes have been so extraordinary for multitude as to overwhelm even the best exerted powers of railroad resources), may partly be attributed to the return home of our earlier visitors, with their provoking accounts of the wonders they had witnessed and the reception they had enjoyed. These, of course, stimulated their compatriots all over Europe, and, rushing to the attraction, the circles have gradually widened, as of stones thrown into water.

The influx of crowds from the provinces has also added conspicuously to the occasional population of London; insomuch that the usual *habitué*, in walking about, whether in the City or the West-End, seems to mix with quite a different set of beings from those with whom he has for years been accustomed to jostle.

In noting the striking features of this strange period, it must occur to the observant mind, that these causes have produced a commensurate and remarkable increase of activity among several classes of the community, and called into useful and profitable life a very considerable number of people, who, in common times, subsist on more precarious and predatory means. Now, they have employments, and with employments vice and crime necessarily diminish. This will account for the phenomenon of an obvious decrease in the criminal statistics and police turmoils of the metropolis, in a season of much excitement and external invasion, respecting the effects of which, *à priori*, not unreasonable apprehensions were entertained. On every hand, and all day long, we see cabs, omnibuses, eating-houses, publicans in hundreds, supplying their thousands of customers, in the open air, stall-keepers of every description for fruits, oysters, slices of pudding, cakes and buns, ginger beer, and similar low-priced entertainments, from a halfpenny to two or three pence: the multitude of waiters upon Providence, or rather the hangers-on for any errand, chance job, or accidental catch—these and many others, needless to particularize, are at this moment in something like remunerative occupations, and find food and lodgings without theft, degradation, and misery. But, having taken this view, the question arises what is to become of this too numerous and anomalous section of the people of London, and how are they to be disposed of, when the Crystal Palace shall be closed, and our tens of thousands of stranger friends shall have departed? In short, what will the capital be next winter? The classes to which we have referred have not the character of being prudent or provident; and it is to be doubted whether many of them will think of laying by for the months of famine during the months of plenty. The speculation is an interesting one for humanity; and it will require every effort that wisdom and benevolence can make so to regulate the course of labour as to mitigate a condition of things that is otherwise likely to be injurious to society at large. For, as we read in the Chinese department of the Crystal Dome (most fitting receptacle for specimens from the Celestial Empire), you ought to

Dig a well before you are thirsty,

and

The pleasure of doing good is the only one that does not wear out;

so ought we to look forward to the probable result of an era, unexampled for the change it has made on the habits of all, and especially of the poorer orders of the population of our Babylon city, and do our endeavour to render the next and certain phase a continuance of benefit, and not a reverse in the history of this peaceful congress of nations. The gratifying exhibition of the industrial products of every soil and climate on the globe, having, by a collateral action, given a spur to living industry, among the persons and to the extent we have noticed, it is well worth our while to try to preserve them, both for the future welfare of our nearest neighbours, and the world at large. With this feeling we may again revert to the quaint Chinese proverbs, which are set forth in their compartment in the Exhibition, and enforce their truth in the following adages:—

Let every man sweep the snow from before his own door, and not busy himself with the frost on his neighbour's tiles.

A hint, no doubt, for employing the poor, next winter, in sweeping our streets more regularly and effectually than has been always done in severe weather: and, further, we learn that

Great wealth comes by destiny—moderate wealth by industry.

A fair axiom, and equalled by the last brief example we shall quote; viz.

The ripest fruit will not fall into your mouth.

Veluti in speculum: thus may we gather knowledge from every part of the Glass House, and be thankful for the fiscal reduction of the duty on an article of which it is mainly built; without which reduction we never could have seen it rear its clear and capacious head amongst us, to constitute, with the seven of antiquity, our eighth and greatest wonder of the world.

But having in our desultory method (for we claim method, although desultory) got into the industrial, mechanical, and preceptive contributions of the Orient, we trust we shall be excused if we conjoin with this portion of the subject a glance at the intellectual progress which flows from the intercommunion between the West and East, which has been so happily and auspiciously established through the medium of this grand design, wrought out with a success far surpassing the most sanguine expectation that could have been formed, and fraught with consequences still farther beyond what any human imagination can conceive.

In the Exhibition itself, we look with pleasure and curiosity on the articles of Ottoman arts and manufactures. The weaving of wools and silks are very fine and beautiful, the colours fanciful and brilliant; and we get accustomed to names and familiar with garments of which we had but a poor idea from book reading. We know all about burnouses, and joubbas, and calabashes, and kalebsheds, and spax turbans, and yamany and telemsany slippers, &c. The same remark applies to the rich and exquisite specimens of gold and silver tissues, the splendours of embroidery, the admirable manipulation of leather, work in metals, preserved preparations and luxuries, such as hemira, azyzy, nigida, sbihy, mahmouds, &c.; perfumery and cosmetics, including k-hol for blackening the eyelids of the fair, and swak for cleaning their teeth; ornaments, and every variety of costume; from which we ascertain more of the physical condition, manners, and customs of the people than we could extract from all the books of travel that ever were published. But it is yet more important to glance, as we have intimated, beyond the mere physical and commercial considerations, to the intellectual improvement of countries, now for the first time brought into close as well as general intercourse with each other, and in a harmony of spirit and earnest desire to live and learn.

Every intelligent reader is aware of the peculiar feelings and jealous exclusiveness which have hitherto belonged to the Turkish Government and Mahometan people. Next to China, Japan, and two or three other minor states in the East, the Turk has entertained the strongest dislike to the Frank and his opinions, and entertained the least desire to imitate or adopt them. A simple portrait was a thing utterly prohibited by his faith, and Giaours and their ways were spit upon and held in abomination. But the Crystal Palace has helped to do away with these prejudices and eradicate this hostility. Will not the reader be astonished to learn that the Grand Seignor has just founded an Academy of Sciences and Belles Lettres in Constantinople? The *Tagvimi Vequa'i*, or "Official State Gazette," has published the statutes and rules of this Academy, prefaced by an exposition of the reasons for creating it—altogether astonishing when we reflect upon the actual condition of the Empire only twenty or ten years ago. The Sultan and his ministers and councillors set stoutly in array the advantages which science (hitherto scouted and reviled throughout the land) possesses over ignorance, and insist upon the blessings of civilisation, and increase of power among the people ("people," a phrase up to this date unacknowledged or detested!), by the diffusion of enlightened principles and improving information. The *Tagvimi Vequa'i* (it is wonderful that the types could render the requisite service) contends, in a convincing style, that the Mussulman race will shine with vivid *éclat* in the republic (*domaine*) of human intelligences. It boasts of glorious monuments and memories, but confesses that during a long period the Turkish authors have not done more than attempt illustrations of literature and eloquence. Whilst poetry and rhetoric have been assiduously cultivated, now they find themselves, at an epoch when science, properly understood, has taken such giant steps and opened so vast a career of activity to the soul of man, ever seeking

the solution of problems for the material and moral amelioration of his kind, far behind in the race, and the Osmanlis name a term of reproach which their character and genius do not deserve, and which they may soon redeem from the scandal. We would willingly and gladly accept the prognostic, and hope speedily to see Turkey emulating the most eminent nations of Europe in the pursuit of every useful and refining science; but we cannot altogether confess our reliance on the event being realised by the literary and poetic class, on whose past performances such a eulogy has been pronounced. We would rather place our reliance on a new growth, which this novel encouragement may educe out of the people. The past pertained to the artificial, the ideal, and the restricted; the future, to be worth anything, must pertain more to the actual, the real, the practical, and the expanding. The appeals must be to common sense and understanding; and not as herctofore, addressed to the nation, in so over-laboured and over-polished a manner, that not one in a hundred of the population could guess at a meaning. Yet these men are of fine minds; and it is by a combination of the poets and *savans*, such as they are, with the more modern school—that is to say, by running side by side the ideal and the real, the beautiful and the useful, the imaginative and the active forces of man—the greatness of the Ottoman Empire will be harmoniously and beneficially developed, and an immense progress be made in the social advancement and welfare of the entire Mussulman world. At any rate, we may congratulate them that the seed is being sown, and the fruits of this institution cannot fail to contribute to their improvement and happiness. There are Turkish ladies to be seen in the Crystal Palace, and driving in open carriages, openly about the streets of London; and, at the same time, the Sultan is hurrying on the Council of Instruction, to complete the establishment of his Academy of Science. These, indeed, are signs of the times; and it will, we presume, interest European readers to be told somewhat more about this remarkable novelty. The meetings are to be held monthly, in the college, which the "Validé Sultane" has recently built and placed at the disposal of the Academy, of which the renowned scholar and Caziasker* is the president; Chérif Mollah Efendi the vice-president; and Hairoullah Efendi, member of the Council of Public Instruction, the third member.

When founding similar societies in Europe, it is justly observed that the patrons and professors are chosen from persons experienced in and esteemed for their qualifications in reference to the peculiar objects to be pursued; but Turkey offers little or no choice of this description. Its *élite* are of a very homogenous kind, and the election appears to have been made (of necessity) from the high dignitaries of the civil and religious orders, eminent officials, generals, poets, philosophers (so called), lawyers, philologists, grammarians, linguists, &c., to the number of forty, with whom are to be associated an unlimited number of learned men of distinguished reputation throughout Europe as corresponding members. Transactions are to be promulgated, foreign works to be translated or edited, and a valuable library collected.

Such is the broad outline; and it may serve as a curious example of the human material thus called into action, if we specify some of the leading members, and the qualities which have recommended them to this distinction; for which, by the way, a knowledge of languages, especially Turkish, Arabic, and Persian, seems to be an essential requisite. From the translation of books on art and science into the vulgar or common Turkish, a universal benefit is reasonably anticipated; and honours and advantages divided into three degrees, according to the merits of their productions, are to be accorded to the members who employ themselves on useful works: the third will receive the profits of his book and a remunerative grant of money; the second, the price settled for that degree, and his name, inscribed in the book of the privileges of the Academy, will descend to his posterity; the first will enjoy all the preceding privileges, and have the additional honour of an Imperial medal.

From the list of the forty academicians, we copy the following as illustrative of the foregoing statement:—

The Grand Vizier Moustafa Rechid Pacha.

Aarif-Hikmet Efendi, Cheik-ul-Islam, learned in jurisprudence and distinguished in literature.

Muterdjim Mehemet Pacha, Minister of War, and conversant with many languages, and author of many works on government.

Rifa'at Pacha, President of the Council of State, and writer of many books on morals.

A'ali Pacha, Minister of Foreign Affairs; a highly esteemed poet.

Emin Pacha, General-in-Chief of Arabistan, of a European reputation in mathematics, &c.

Ismail Pacha, Minister of Commerce, Agriculture, and Public Works; a doctor and member of the Academy of Medicine of Paris.

Sami Pacha, Inspector-General of the European provinces, and conversant with many tongues.

Youssouf Kiamil Pacha, member of the Council of State, and a distinguished literary man.

Mechreb Zaade Arif Efendi (the Caziasker aforesaid), an Arabian poet, and one of the most eminent *savans* of the empire.

Tahsin Bey, Nakib (or grand judge of the nobles), learned in theological and mystical science.

Fuad Efendi, Councillor of the Grand Vizier; a poet of great merit, and author of a national grammar.

Ziver Efendi, Director of the Imperial School of Medicine, and an esteemed poet.

Lehib Efendi, President of the Chamber of Accounts, author of many statistical works.

Redjai Efendi, director of the printing-houses and censure, and historiographer of the empire.

Ahmmed Véfik Efendi, without addition to his name; but we may state, from personal information, one of the most accomplished individuals, not only in this list, but in the Turkish empire, and with few rivals in the European world.

Lieut.-General Ethem Pacha, a mineralogist.

Lieut.-General Ibrahim Pacha, a connoisseur in the fine arts.

Lieut.-General Dervich Pacha, author of scientific works on mathematics and physics.

The Grand Judge Hassan Efendi, a celebrated professor.

Emin Mouklis Efendi, a philologist.

Noureddin Bey, Dragoman to the Divan†; a philologist, to whom the two principal languages of Europe (English and French, we presume) are familiar.

Sali Efendi, another distinguished professor in medical sciences.

Elias Efendi, a judge of the second class, and a theologian.

Tahir Efendi, a poet.

Colonel Nouri Bey, a distinguished *literateur* and linguist.

Ahmmed-Djevdet, a grammarian.

Professor Chaki Efendi, a vastly renowned scholar.

The few remaining names are not so marked; but these will suffice to show how such matters are managed in Turkey; and how poets, doctors, and authors (some of them of no great fame) are respected and rewarded by barbarians, as we call them; yet the example might be advantageously followed among wiser and more pretentious people.

A dozen of the corresponding members are also mentioned, among whom we noticed the "learned Davoud Pasha, Governor of the Sanctuary of Mecca;" Veli Pasha, Governor of Candia, conversant with many languages; several professors of the Grand University; Ebu-Sued, an able translator; Prince Vogorides; Messrs. Redhouse, Hammer, and Blanqui, and Dr. Stefanaki Caratheodory.

After all, what is the universality even of living fame. We dare to say, that many of our own magnates, in literature and science, are as utterly unknown beyond their own spheres as these celebrities of the Ottoman Empire! The grand operation of national meetings, like this of the year 1851, if they can be, as they should be, repeated, will tend more to cosmopolitan union and prosperity than ten times ten thousand of the most eloquent treatises that ever were or could be written; and, as many extreme exertions of individual devotedness or government influences in separate countries, without a common tie, or the transfusion of a common sentiment for the mighty and desirable common objects of peace, goodwill, and mutual brotherhood. Well did Burns, as it were, prophetically sing—

> Then let us pray, that come it may,
> And come it will for a' that;
> When man to man the world o'er,
> Shall brothers be an' a' that!

It is delightful to contemplate the actual efficacy and the probable results of the unparalleled assemblage of the Crystal Palace, in these two distinct, yet conjoined points of view; and see mingled together, as of a similar nature and tendency, the intellectually elevated and the practically useful—the future possible, and the absolutely immediate. Let no man think the imaginative and the utilitarian uncongenial, and, far less, antagonistic interests. The inventive is as potent as the inductive, and they are destined to work both together for the good of mankind. In our last Notes, we deduced lessons of wisdom and love from the inspiration of flowers, and their exquisite mechanical resemblance; thus combining nature and art, and teaching that each was to be cherished for improvement and instruction. As Charles Swain has charmingly expressed it—

> Have not the flowers a language? Speak, young *rose*,
> Speak, bashful sister of the footless dell!
> Thy blooming loves, thy sweet regards disclose;
> Oh, speak! for many a legend keep'st thou well:
> Old tales of wars—crusading knights who fell,
> And bade thee minister their latest sighs!
> Speak, greybaired *daisy!*—ancient *primrose*, tell!
> Ye vernal harps! ye sylvan harmonies!
> Speak, poets of the fields! rapt gazers on the skies

And this flows from Manchester, the great nurse of mechanical invention and industry! If it can be also sweet and redolent in poetry, as it is astounding in the noise of machinery, and almost appalling in the cloud-atmosphere of innumerable engines, does it not offer a pregnant model of the truth of our present theory, that there is no quality of mind imprinted by the almighty Creator on the human species that is not destined to contribute to the well-being of the whole. As we have quoted the verse as an example of refining thought, so will we close this paper with a notice of the wonderful advance of ingenuity in the application of the scientific and useful. We have already the lightning speed applied to motion and the transmission of language—again a combination of the real and the impalpable; and what will be thought of the same agency being adopted for the stoppage of motion and the cessation of speed! Yet so it is. Electro-magnetism is about to be introduced, not to accelerate railway trains on their journeys, but to supply a means, superior to all breaks, and turnings off of steam, for enabling their conductors to bring them softly and certainly to a stand-still whenever expediency or necessity requires that measure. The experiment has been successfully tried, and, we have little doubt, can be employed on the largest scale. Wheels can be instantaneously converted by the person in charge of the carriages into electro-magnets, the effect of which upon the railway line will be to afford an additional grip and power for ascending inclines, drawing loads hitherto intractable; and, when used on levels or descents, from the same hold upon the iron rail, bringing, as we have intimated, the headlong mass to a gradually diminished celerity and a well regulated stoppage within an exceedingly short distance—a distance, in fact, as short as is consistent with absence of concussion and damage.‡

MARTINUS SCRIBLERUS.

* Caziasker is the President of the High Court of Justice.

† Since promoted to be an Under-Secretary of State for Foreign Affairs.

‡ The establishment of a model farm, *à la* Mechi, at Bucharest, with agricultural implements selected from the Crystal Palace, may be cited as another pregnant instance of progress.

PLUMMER'S PATENTED MACHINERY, USED IN THE MANUFACTURE OF FLAX, &c., No. 74, CLASS 6.

The machinery exhibited by Mr. Plummer, of Newcastle-upon-Tyne, is highly interesting at the present time, when the culture of flax is likely to be carried to so great an extent in the sister country. The whole process of flax-dressing was carefully shown to us by the obliging and intelligent person exhibiting the machinery on the part of Mr. Plummer; and it was not a little interesting to have been present when the great and illustrious Captain of the age received his lesson in the useful and important art of manufacturing flax.

In the first place the plant is shewn as taken from the field, and subsequently in its various shapes and conditions, until completely manufactured for the market.

The first part of the process is to place the flax in cold water, and gradually to raise the temperature during twelve hours, until it reaches 90 degrees of Fahrenheit, at which temperature it is kept for 48 hours more. It is then taken out, and properly dried: when thoroughly dried, it is passed into the *crushing* machine, which consists of five indented rollers, rotating horizontally.

After undergoing the operation of crushing, by which all the fibres of the plant are broken up, it is taken to the *Scutching* machine, having a large disc of yellow pine 6 feet in diameter, which is made to rotate at a sufficient rate of speed to *scutch* the flax effectually. The disc is attached to metal arms, and is divided on either side into six compartments, each containing two brushes, thereby working double. The brushes differ considerably in construction: the first is 14 inches long by 4 inches wide, consisting of wire $\frac{7}{8}$ of an inch long, and of the description known as No. 22, Birmingham wire gauge. The second brush is of the same dimensions as that already described, but instead of wire is made of strong whalebone. The third brush consists of whalebone and bristles alternately; and the fourth brush is made up of three parts of bristles and one part of whalebone. Thus, there are altogether 24 brushes. Four boys are employed in this part of the process—the one handing the material to the other in turn, the wire brush being first used.

Heckling is the next part of the process. This is performed by placing the material into the double oscillating cylinder heckling machine, in which it is suspended from short moveable arms, to undergo the operation of heckling, which is effected by ten rows of heckles and brushes, divided equally, so as to intersect each other throughout in their distribution in the cylinder. Some of the wires, which project $1\frac{3}{4}$ of an inch, are placed six to the inch, while others are placed eight to the inch. The holders have cheeks of gutta percha, which are found to last out six of those ordinarily used. In front of the machine are three boxes or receptacles for three descriptions of tow, which passes down from the cylinders by means of an endless chain or series of round wooden bars.

The whole of this machinery is kept in motion by one of Hodge's four-horse engines.

Mr. Plummer also exhibits good samples of "all long" flax canvass, made from flax dressed by his patent machinery, and manufactured by Jonas Eccleston.

There are also exhibited slips of canvass 1 inch wide, whose strength has been tested to 490 lb. for the warp, and 560 lb. for the weft.

(*To the Editor of the* ILLUSTRATED LONDON NEWS.)

SIR,—You have admitted into your paper of the 9th inst. the expression of a grievance in connexion with the Great Exhibition; will you permit me to call your attention, and through you the attention of those to whom it belongs to rectify it, to another, which, doubtless, to the apprehension of many, will appear even the greater grievance of the two. I would not undervalue the claims of the Exhibitors to the privileges which they consider to be their right, but it must be acknowledged that the advantages which will result from the Exhibition will in many if not in most cases, primarily accrue to themselves; the Exhibition itself will have been to them one enormous advertising medium for their goods; and many are even now, and more doubtless will be hereafter, reaping the benefit. But the class of men for whom I would claim some slight acknowledgment for essential services rendered, some small meed of gratitude for important work performed, the local secretaries, are men often probably, in some cases certainly, not exhibitors, but who have undertaken and worked out the matter in their districts simply for the love of it, because they believed the idea to be but the undeveloped form of a great and glorious fact, and they were willing to render their aid to clothe that idea with reality, and to warm and foster the conception into active and vigorous life.

You must be aware that in many country districts it was no easy task to awaken interest, to solicit subscriptions, to induce contributions, and to attend to the necessary details for the transmission and admission of goods, the whole of which duties combined have in some cases devolved on the local secretaries, and this labour they undertook as a labour of love, without thought or hope for reward. The more reason would it have appeared to any unprejudiced observer—though that it did not seem so to those who had the management of affairs, has been abundantly proved by the marked neglect with which they have been hitherto treated by the authorities of the Exhibition—that they should have received some mark of attention and of recognition of having materially assisted in the success of the undertaking. But such they have not received, not even the privilege of a reserved place at the opening ceremonial for such as chose to purchase season tickets; in fact, they have had no more regard paid them, than as if their exertions had been of no service to those who, while, it is true, they have had the most arduous labours, have had *all* the honours. Witness, in proof of this, if proof be needed, the absence of the local secretaries from all share in the Parisian *fêtes*, so generously and so hospitably given by our French neighbours in honour of the Exhibition—an absence, however, which reflects not at all on their hospitality, inasmuch as there is no need to go further to seek for its cause than to the strange neglect with which the local secretaries have been treated by the authorities at home. You yourself, too, have, doubtless, from the same cause, been led into the mistake of saying, in your able leader of last week, that invitations had been given by the Parisians to "all the persons whose names and labours were associated with" the Exhibition, a statement, as you will perceive, manifestly incorrect, inasmuch as a body of men who have rendered such important services were not included.

It is not yet too late to repair, in some small degree, this unaccountable neglect on the part of the authorities of the Exhibition, though I fear that it will not be done except by the powerful intervention of some member of "the Fourth Estate;" and therefore it is that I have ventured to address you on the subject, in the hope that if you do not yourself take up the cause of the Local Secretaries, you will at least allow this letter to appear in the columns of your valuable Journal.

I am, sir, yours obediently,

Aug. 13, 1851. NOT A LOCAL SECRETARY.

TO CORRESPONDENTS.

PAX—The only arms to the name of PAXTON registered in the Heralds' College are, we believe, those granted May 13, 1806 to the family of PAXTON of Watford-place, Herts, and Middleton-hall, county of Carmarthen, which family derived descent from ancestors resident at Berwick and on the Borders. The arms to which we refer are, "Erm. two chevrons, one sa., the other az. in pale, three mullets of the second. *Crest:* An eagle's head erased az. charged on the neck with two chevrons or, between a pair of wings arg. semée of mullets gu." The late Sir WILLIAM PAXTON, of Middleton-hall, M.P., for Carmarthen, was younger brother of Archibald Paxton, Esq., of Watford-place, Herts, who died in 1817

AN AMATEUR, H WILSON, F G M, Edinburgh; NEOPHYTE—Ward's Cases may be ordered at any zinc works; and the panes may be had of Loddidge, Hackney; or Veitch, Exeter

J W P—We believe that there is no positive law against an unscrificated bankrupt acting as a trustee; but, no doubt, a court of equity would prevent such a person from so acting, if applied to by the *cestui que trust*

AN INQUIRER—A marriage license in the diocese of Exeter may be obtained from the Bishop's proper officer there, and the cost of it known. Such license is only available in the parish where one of the parties to be married has abided for fifteen days prior to the grant of the license. This, of course, does not apply to the special license of the Archbishop of Canterbury

Γ M—Impaled coats of arms may be used by the husband and wife on seals.

H Y Z—One-third to the widow; the residue among the children

H H, A SUBSCRIBER—The question relates to a private affair; a solicitor should, therefore, be consulted

A Z—By the 15th Geo 3, c 51, and the 48th Geo 3, c 88, s 2, *all* bills and notes for sums under 20s are void

R F—The ordinary marriage license is that of an Archbishop, or Bishop in ordinary, which permits the marriage to take place under certain statutable restrictions, such as confining the ceremony to the parish where one of the parties has abided fifteen days prior to the licence. The special licence is that of the Archbishop of Canterbury, when he exercises the power which he has of granting special licences to marry at any convenient time or place.

G H Y—The widow, in the case of their being children, is entitled to one-third of her intestate husband's personal property. Under ordinary circumstances, administration will, in preference, be granted to her. The widow has also a right to the third part of the real estates of inheritance which her husband may have had in possession during the marriage, unless this right, which is called dower, be barred by one of the many impediments to it which the law provides. We believe the law on these subjects is the same in Kent as elsewhere in England

A SUBSCRIBER—The Marquis de la Force, who commanded the Huguenots, at Rochelle, was, we believe, the same person who was afterwards made a Marshal of France and a Duke. The arms of the house of Caumont, Dukes and Marquesses de la Force, are, "Az. three *leopards* paleways or langued armed and crowned gu."

A SUBSCRIBER—Yes, such chattel property will be subject to legacy duty. See the 36 Geo 3, c 52s, 19

E J, Preston—If a letter, bearing two penny postage stamps, be too late for the regular London post hour of half-past five, the addition of one head more will enable you to get your letter off until six o'clock. In this case three postage stamps are of more use than two. Lichfield is a city and county of itself, although locally situated within the county of Stafford. The Scots Greys are the 2d Regiment of Dragoons

A HERALD—The proper style of a Marquis is "Most Honourable;" of a Duke, "Most Noble." The latter is likewise styled "His Grace"

VIATOR, North Wales—Lady Caroline Stanhope, sister of the Earl of Harrington, married Edward Ayshford Sanford, Esq, of Nynehead, county of Somerset, on the 21st of June, 1841. Mr. Sanford had been married before, viz. Nov. 4, 1817, to Henrietta, daughter of Sir William Langham, Bart, which lady died Aug. 24, 1835. Sir John Hesketh Leathbridge, Bart, is married to Julia, second daughter of Sir Henry Hugh Hoare, Bart. Miss Leathbridge married Ambrose Goddard, Esq, of Swindon, Aug. 1, 1816, and died March 6, 1843

J F—The arms of Paddon, of Hampshire, are—"Arg. a band between three crescents sa. flammant ppr. *Crest:* A tower or, flammant ppr." Arms of Locke—"Per fesse sa. and or, a pale counterchanged, three hawks, with wings endorsed of the last. *Crest:* A hawk, with wings endorsed, holding in the beak a padlock or"

A CONSTANT READER—The Marquis of Stafford married, in 1849, Anne, only daughter and heir of the late John Hay-Mackenzie, Esq, of Newhall and Cromartie. Viscount Northland married, in 1848, Harriet, eldest daughter of the late James Rimington, Esq, of Broomhead Hall, Yorkshire. Lord Guernsey married, in 1846, Jane Wightwick, only daughter and heir of the late John Wightwick Knightley, Esq, of the Bury Offchurch, co. Warwick

IGNOTI GRATIA—There is a pedigree of Sir Thomas White in Berry's "County Genealogies." Refer also to Wood's "Athenæ Oxonienses," and to Burke's "Landed Gentry." You would not be entitled to claim through your uncle's wife

C E P—The letter has been posted

FURCTILIO—The precedence and courtesy designation are lost when the appointment which conferred them is no longer held

A SUBSCRIBER, Wisconsin—We can trace no arms or other details in connection with the family in question

T V W—The arms of Thompson, of Glasgow, are—"Arg. a stag's head caboshed gu. on a chief wavy, az. a crescent fitchée, between an anchor and a billet, all or. *Crest:* A dexter hand holding a branch of flowers ppr. *Motto:* Industria murus"

GRAFFENBERGER—The members for the county of Limerick are W Monsel, Esq, of Tervoe, and W Goold, Esq; for the county of Clare, Major Macnamara and Sir Lucius O'Brien, Bart. Mr Brand, M P for Hertfordshire, has taken the name of Trevor, and is now the Hon Thomas Trevor. Sir W P Gallway, Bart, has succeeded J Bell, Esq, as M P for Thirsk. Sir G R Philips, Bart, is still M P for Poole

COMERATH—Lieut-General Sir A Clifton's town address is 15, Old Bond-street

AN OLD SUBSCRIBER—The "I" in the name may be changed to "y" without fear of any legal disqualification.

W P—The arms of Packer are—"Gu. a cross logeny between four roses arg. *Crest:* a Moor's head couped sa. wreathed about the temples or and gu." W P is not related at all to the lady, and can legally marry her sister

A SUBSCRIBER—The husband of an heiress has a right to bear on an escutcheon of pretence, not only his wife's paternal coat, but all the arms her father was entitled to quarter. The son of the titled pair will inherit the whole of his father's and mother's quarterings

M I J—Strictly speaking, we deem the simple impalement of the second wife's arms the most correct usage, according to the laws of heraldry. Some writers maintain, that if a man have had two wives, he may impale the arms of both; but this rule seems to us inconsistent. The intent of impaling is to show that the bearer is married to a woman of a particular family; but when by her death the alliance is at an end, he ceases to use the ensigns of her name. In the case submitted, the descendant, wishing the ensigns of his ancestor (who married the two wives) to be depicted on a separate shield, might have them arranged thus: the first wife's coat on an escutcheon of pretence; the second wife's, impaled; but still this would not be strictly correct.

CHERUBIM—The son of a lady (one of two or three sisters) who had no brother would be clearly entitled to quarter his mother's arms, without reference or regard to the inheritance of property. A search through parish registers, wills, and family papers is the best course to discover a line of descent

CORINNA—A lady is not entitled, under any circumstances, to use a crest

ENQUIRER—You must pass an examination on entrance

F W—Yes. The Peers in the House of Lords, and the Commons in their own House, whether Roman Catholic or Protestant, take an oath of allegiance. The Roman Catholic form of oath, however, makes no mention of spiritual supremacy and abjuration

A R—An executor is by no means excluded from deriving any benefit from the will. That exclusion only applies to the witnesses to the will. Mr Allnutt's work upon Wills is both cheap and useful

A X—A retired military officer may with propriety place a cockade in his servant's hat

G L H—The arms of Hulme are, "Barry of eight or and az., on a canton arg. a chaplet gu. *Crest:* a lion's head erased gu., langued az., ensigned with a cap of maintenance"

T A, LOUNE—The first wife of Percy Bysshe Shelley, the poet, was Harriet Westbrook. By her he had a son, Charles, who died young, in 1826; and a daughter, Ianthe-Eliza, married to E J Esdaile, Esq

LORFORD—Edward, Duke of York and Albany, K.G., brother of King George III., was born 1739 and died 17th September, 1767. He never married. The date of his elevation to the Dukedom is 1st April, 1760

A Q, WATERLOO—Chateaubriand died July 4, 1848. See Memoir and Portrait, ILLUSTRATED LONDON NEWS, No. 326. Louis Napoleon was born April 20, 1808

E GURST—Sir George Smart resides at 91, Great Portland-street, Marylebone

MEGRAT—Ground-plans of the Crystal Palace appeared in the ILLUSTRATED LONDON NEWS, Nos 469 and 483

W R—A portrait of Madame Fiorentini appeared in No 477

A COUNTRY SUBSCRIBER—See the Emigration Supplement to the ILLUSTRATED LONDON NEWS, No 434

J S L—See the Engraving of Phillips's Fire Annihilator, in No. 389 of our Journal

H G—Apply to a dealer in second-hand books

F G S—See "Valentine's Day," in the "Illustrated London Almanack" for 1846

H T—Apply, respecting Papyro-Plastics, at 40 and 41, Old Broad-street, City

J F, New Stamford—An Engraving of the Bonjesmans, exhibited in Piccadilly, appeared in No 267 of our Journal

LIVERPOOLIAN—The electric light was exhibited in London in 1848

ΘΩΑΣ—Rush was executed April 21, 1849

EIN ABOUMENT—The address of the Prussian Embassy in London is 9, Carlton House-terrace

M F, Birmingham—Donizetti, the composer, died in 1848. (See his Memoir, with Portrait, in No. 313 of the ILLUSTRATED LONDON NEWS)

91—Cardinal Wiseman is a native of Seville

H W—The present sir Robert Peel was born May 14, 1822

AURELIAN—Felicia Hemans, the poetess, was elder daughter of George Browne, Esq, and sister of the present General Sir Thomas Henry Browne, of Bronwylfa, co. Flint. She was born 25th Sept, 1793

TITUS—The height of the Venus de Medici is 4 ft. 11½ in. without the plinth

WALLINGFORD, Berks—Sion College is situated at London Wall. The Library, of 40,000 volumes, chiefly theological, is open to respectable persons who have any particular object of inquiry in view. Admission by an order of one of the Fellows (incumbents of London parishes), daily, between ten and four; but books are not allowed to be taken out

W C, Pittsburgh, is thanked for the sketch of Chagres, which has already been engraved in our Journal

G W, Bradford—The town address of the Earl of Carlisle is Grosvenor-place

G C B—See "Hints on Etiquette," published by Longman and Co.

A SUBSCRIBER, Wimborne—Apply for a passport at the office of the French embassy

A COMPETITOR—We hope to engrave the Northumberland Prize Boat next week

W E, Alton—Any fancy stationer will furnish you with the proper varnish

M'TAVALL—See the article on the Organ, in the "Penny Cyclopædia"

A RURAL READER is thanked; but we have not room to print his letter

S T W—Nesbitt's Academy, Kennington-lane

PROSPERO—The old buildings at Billingsgate Market will be removed. The Zoological Society's Gardens, Regent's Park, occupy 36½ acres

A DUBLIN SUBSCRIBER—See "Foster on Book-Keeping"

AN OLD SUBSCRIBER may probably obtain the birds at Beaufort-street, Chelsea

INQUISITOR, Lewes—See the article on the "Zollverein Contributions to the Great Exhibition," in No 505

M B, Dalston, and G M, Kingstown, are thanked; but we have not room for the Illustrations

A SUBSCRIBER, Dover—See Minton's "Art of Making Wax Flowers"

L J, Bath—See the published treatise on "Gutta Percha"

A CONSTANT READER, Higham Ferrers—Bath chairs are admitted into the Great Exhibition on Saturdays

B W B, Wynnestowald—We have not space to illustrate the subject

J T—We cannot undertake the recommendation

J C, Euston, near Woodbridge, is thanked

M Q, Ely—Apply to Messrs Beard, Photographers, City

B W, Newcastle—See Vacher's "Parliamentary Companion"

T W—We have not room for the Institution report

R E—Address Mr O'Byrne, care of Mr Murray, Albemarle-street

MORNCASTLE—See Wade's "Hand-book to the Pianoforte"

G H C—The Quadrature of the Circle has not been accomplished

PIKE, Lincolnshire—See Murray's "Modern London"

C C, Macclesfield—Address Regent's-park

MIGNIONETTE—The address is 1, Stratton-street, Piccadilly

J W—The larger impression is from a coin of Faustina, jun

INQUIRER, Bristol—See "Jackson's History of Wood Engraving"

W H O—The communication has been destroyed

A S, Paddington—Apply to Day and Haghe, Lithographers, Gate-street, Lincoln's-inn-fields

D B, Bristol—We regret that we have not room

S T, Kilmarnock—The shilling of Charles II. is of no value

TAYPORT—The copper coin of which you have sent us an impression is of no value

TOPOS—See "Holtzapffel on Turning"

E C E—A zoophyte is an animal-plant, or plant-animal; *i. e.* partaking both of the nature of animal and vegetable

RUS—Apply to the Keeper of Antiquities, British Museum

S F, Dulwich—The lines from Chaucer, coincident with the Great Exhibition, are quoted in the ILLUSTRATED LONDON NEWS Supplement, June 14, 1851. The parallel was originally drawn in the *Notes and Queries*, No. 80, by a correspondent who has contributed to that Journal some admirable illustrations of the Father of English Poetry. The poem in question, "The Temple y'made of Glass," a prevision, is there reprinted from "The House of Fame."

W J A, Minories—Meurice's Hotel, Paris

C K, Strand—We cannot inform you

J W W, Hull—See any treatise on gauging

PEVERIL should apply to a bookseller

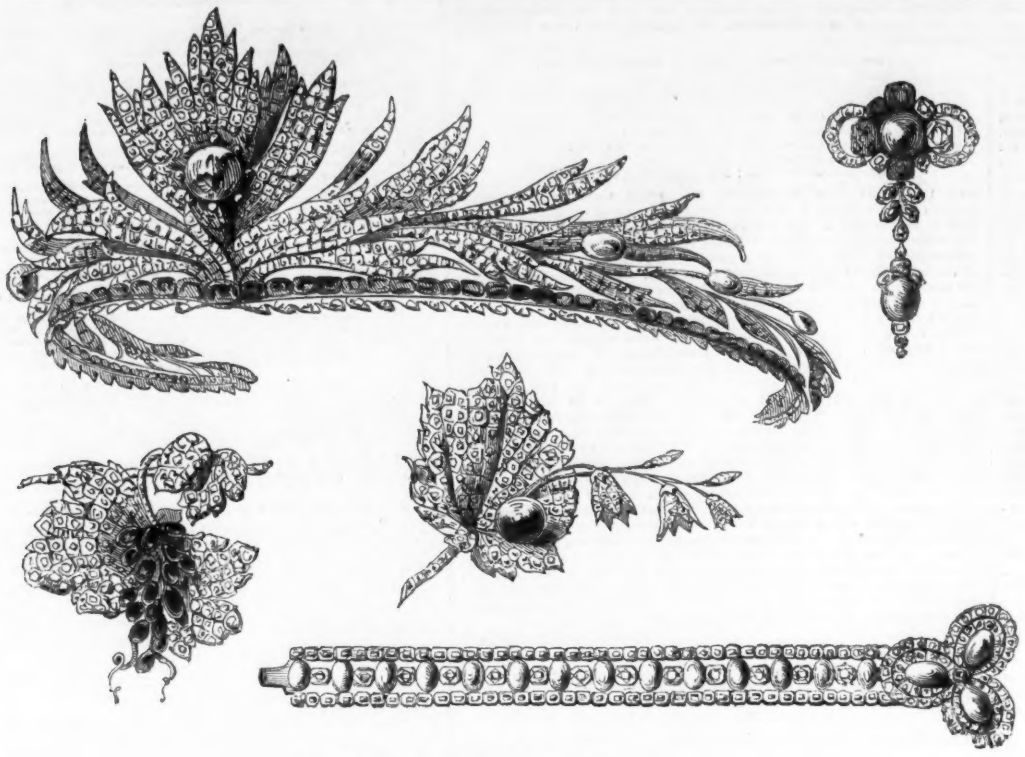
W, Redcar—We have not room

G D, Lindfield, is thanked

A SUBSCRIBER, Hereford—We do not know

R H, Chelsea—The song is ineligible

W W C—We have not room for the lines



GROUP OF JEWELS.—BY BOLIN, ST. PETERSBURGH.

JEWELLED FIGURE OF BRITANNIA.—BY S. H. AND D. GASS

This brooch is of very elegant design, in the cinque-cento style. Under the portico of a Gothic arch, the figure of Britannia, holding with her right hand a trident, and her left resting on a rudder, stands on a shell, emblematical of her sovereignty o'er the seas. Beneath the shell is a winged dragon, representing the evil spirit of anarchy being expelled from peaceful Britain. The figure of Britannia is composed of upwards of 400 small brilliants, of old English cut, of the remarkable size of 250 to the barat; the comb of the helmet and rudder are set with small rubies; the two pieces on either side of the figure are cut from a single piece of carbuncle. The remainder of the brooch, with the dragon, is partly enamelled, and partly set with brilliants. The whole contains nearly 1000 stones, and the workmanship is of the most admirable character.

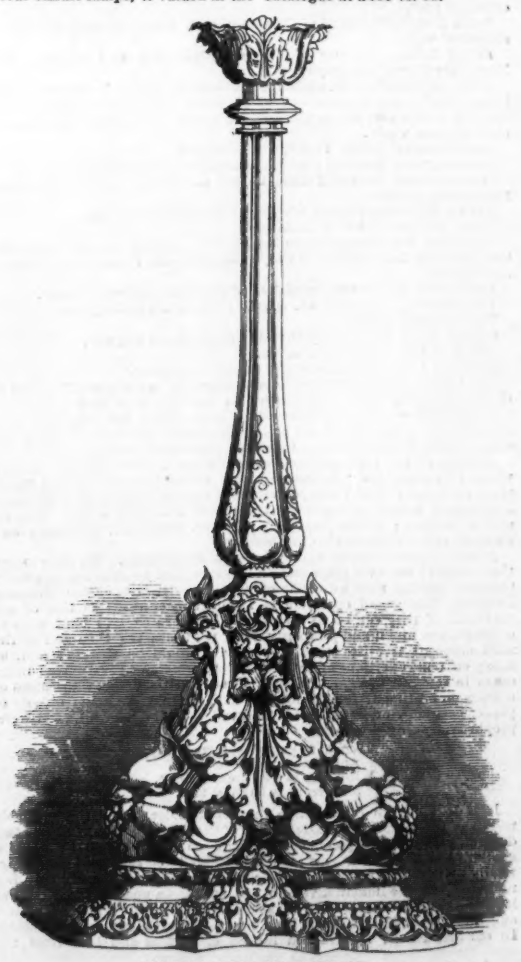
GROUP OF JEWELS. BOLIN AND AIN.

The group of jewels displayed by Messrs. Bolin and Ain, of St. Petersburgh, and which we have engraved, is justly an object of general admiration, both with artists in this line, and the general public. The principal piece is a diadem, containing 1800 brilliants, weighing 260 carats, and 1750 rose diamonds, in all 3500 diamonds, 11 opals, and 67 rubies. The diamonds are all of the first water, the opals some of the most beautiful we have ever beheld—the large one in the centre being, perhaps, remarkable for its rich and varying hues: the rubies are all well matched in colour, a matter very difficult to attain with this stone; the workmanship is of a high order; there is no silver employed in the mounting, all the stones being set *en griffs*. This, though a distinction which perhaps only a working jeweller will understand, deserves to be mentioned. The value fixed upon this diadem is £4800.

CANDELABRA IN THE RUSSIAN DEPARTMENT.

In a recent Supplement we gave Engravings of the magnificent malachite doors and vases in the Russian court: the candelabra, of varied forms, are equally objects of admiration in this department. They exhibit a splendour of material, bronze gilt, a *grandiose* character of design, and a masterly finish, which one might almost pronounce it to be impossible to excel. The largest one, by Chopin, of St. Petersburgh, which stands about 15 feet high, and is intended for 81 candles and four candle lamps, is valued in the Catalogue at £633 6s. 8d.

GROUP OF RUSSIAN CANDELABRA.



CANDELABRUM.—BY WORRALL.

A very creditable design for a candelabrum, very effectively carried out.

London: Printed and Published at the Office, 198, Strand, in the Parish of St. Clement Danes, in the County of Middlesex, by WILLIAM LITTLE 198, Strand, aforesaid.—SATURDAY, SEPTEMBER 6, 1851.—SUPPLEMENT.